John Strohm

STATE OF NEW-YORK.

No. 72.

3

IN ASSEMBLY,

January 27, 1841.

ANNUAL REPORT

Of the Canal Commissioners.

Albany, January 25th, 1841.

To the Speaker of the Assembly:

SIR—

Herewith is transmitted the annual report of the Canal Commissioners.

Respectfully,

Your obedient servants,

SAMUEL B. RUGGLES,
HENRY HAMILTON,
ASA WHITNEY,
S. NEWTON DEXTER,
DAVID HUDSON,
G. H. BOUGHTON.

REPORT.

TO THE LEGISLATURE OF THE STATE OF NEW-YORK.

The Canal Commissioners, pursuant to the requirements of the Revised Statutes, respectfully submit this, their

ANNUAL REPORT.

At a meeting of the Board of Canal Commissioners, in the city of Albany, on the 22nd day of February, 1840, *Samuel B. Ruggles* was chosen president, and *S. Newton Dexter* secretary.

Asa Whitney, *S. Newton Dexter*, *David Hudson*, and *George H. Boughton*, were designated to be Acting Commissioners.

The first division of the State canals, consisting of the Erie canal from Albany to the head of Little-Falls, on the Mohawk river, the Champlain canal and Glen's-Falls feeder, was assigned in special charge to *Asa Whitney;* the second division, embracing the line of the Erie canal from the head of Little-Falls to New-London, seven miles west of Rome, the Chenango canal, and the Black River canal, was in like manner assigned to *S. Newton Dexter;* the third division, comprising the line of the Erie canal from New London to Cartersville, ten miles east of Rochester, the improvement of Oneida river, the towing path on the Seneca river, Oswego canal, Cayuga and Seneca canal, the improved inlet of Cayuga lake, Crooked Lake canal and Chemung canal and feeder, was assigned to *David Hudson;* and the fourth division, including the line of the Erie canal from Cartersville to Buffalo, the improvement of Tonawanda and Ellicott creeks, and Genesee Valley canal and Dansville feeder, was assigned to *George H. Boughton.*

NAVIGATION OF THE CANALS.

The navigation of the canals was opened throughout all the lines, on the 20th of April, and was closed on the 5th of December. Lake Erie was opened at Buffalo on the 27th of April.

During the thirteen years next preceding, the canals and the lake at Buffalo, were respectively opened as follows :

In 1839,	the canals	April	20th,	the lake	April	11th.
1838,	do	do	12th,	do	March	31st.
1837,	do	do	20th,	do	May	16th.
1836,	do	do	25th,	do	April	27th.
1835,	do	do	15th,	do	May	8th.
1834,	do	do	17th,	do	April	6th.
1833,	do	do	19th,	do	do	23rd.
1832,	do	do	25th,	do	do	27th.
1831,	do	do	16th,	do	May	8th.
1830,	do	do	20th,	do	April	6th.
1829,	do	May	2d,	do	May	10th.
1828,	do	March	27th,	do	April	1st.
1827,	do	do	21st,	do	do	21st.

With the exception of a breach, which took place at Schenectady, on the 29th of April, and which was repaired on the 6th of May, and some other less important interruptions which are hereafter stated, no casualties have occurred to suspend the navigation.

The Commissioners of the Canal Fund, in their recent report to the Legislature, (Assembly Document 1841, No. 5,) state that the gross amount of tolls received during the season of navigation

were	$1,775,747 57
and in 1839,	1,616,382 42
Increase $9\frac{85}{100}$ per cent,	$159,365 15

The amount which has been disbursed by the superintendents of repairs during the year ending January 1st, 1841, is $412,979.48. The movement of property upon the Erie canal has been unusually active, especially in the latter part of the season, and more than ordinary efforts have been made to expedite the passage of boats. The sudden increase of business which was experienced upon the coming in of the western crops, and the unequal manner in which the trade is necessarily distributed through the season, caused considerable delay and pressure at the locks. During portions of the season the boats were so much

retarded, that in some instances, the length of their trips to and from tide water, was increased four days.

To relieve the pressure, by enabling the forwarders as far as practicable, to augment their cargoes, the greatest volume of water was admitt d into the canal which its banks were able to sustain, and it may be affirmed, that in this respect, the capacity of the canal was pushed to the utmost limit compatible with safety. The increased facilities which have been thus afforded to the navigation, are shown by returns which have been obtained from the weigh-masters in charge of the five weigh-locks on the Erie canal, to wit: two on the tide water at Albany and West Troy, and three at Utica, Syracuse, and Rochester. The ascending trade of the canal, which consists mainly of merchandise, having been comparatively inactive, the movement from the tide water has considerably diminished. The returns from the weigh-masters at Albany and West Troy, (where nearly all the ascending cargoes are weighed,) show that the number at those two offices, was

in 1839,	6,739,	weighing	181,271 tons—average		26.9 tons.
1840,	5,883,	"	155,113 "	"	26.3 "

On the other hand the number weighed at Utica, Syracuse and Rochester (consisting almost exclusively of descending cargoes,) was

in 1839,	9,575,	weighing	326,806 tons—average	34 tons.
in 1840,	9,625,	weighing	407,847 do	42.3 tons;
			81,039	8.3

showing an increase both in number and weight.

The greatest increase was at Rochester, where the cargoes

in 1839 were	3,974,	weighing	115,507 tons—average	29.0 tons;
in 1840 "	4,110,	weighing	171,869 tons—average	41.8 tons.
increase,.....			56,362	

The number of cargoes at Utica, Syracuse and Rochester, weighing upwards of 50 tons each, was

in 1839, 611;
and in 1840, 1,801.

Of the cargoes at Rochester, 75 exceeded 55 tons; 7 exceeded 60, and there were two of 66½ tons.

The Commissioners have deemed these inquiries important, for the purpose not only of ascertaining the maximum capacity of the present

canal as a channel of transportation, but also of exhibiting the advantages which may be expected from augmenting its depth to seven feet. The results fully confirm the opinions heretofore entertained, that the canal when enlarged, will admit boats carrying cargoes from 150 to 200 tons.

The augmentation above stated to have taken place during the last season, in the weight of the cargoes, has correspondingly lessened the number of boats which otherwise would have passed the locks. Further relief possibly might be obtained by adopting regulations which should prescribe the minimum weight of the cargoes and distribute the trade more equally through the season; but they probably would occasion considerable dissatisfaction, and could be justified only by extreme necessity.

An account has been kept for several years by the lock tender at Alexander's lock, near Schenectady, of the boats passing that point. For the purpose of obtaining information still more authentic, the Commissioners have caused the clearances of all the boats which passed that lock during the last season to be enumerated, from which it appears that the true number was 26,987; being an average of 118 for each of the 229 days of navigation, or 1 in every 12 minutes. The irregular distribution of the trade has, however, crowded into the months of May and October, so great a proportion, that the lockages in those months were,

in May, 3,895, being 125.6 daily, or 1 in 11.5 minutes;
in October, 4,156, being 134.0 daily, or 1 in 10.8 do

and this rate has been itself increased by casualties, which have interrupted the navigation during those months. In May last, the suspension amounted to 6 days; and in October to 1 day; leaving for the remaining 25 days in May, 155.8 daily, or 1 in 9.24 minutes; and for the remaining 30 days in October, 138.5 daily, or 1 in 10.39 minutes. Deducting the days of suspension for the whole season, and excluding April and December, the number of lockages was 25,854 in 204 days; being 126.7 daily, or 1 in 11.36 minutes.

It is stated that in the month of June, 1836, 246 boats were passed at Alexander's lock in 24 hours, being 1 in every 6 minutes; but it is not to be expected that the locks on other levels less favorably situated in respect to their supply of water, will be able to maintain so rapid a rate. At some of them, where the point of supply is remote, it may be doubted whether more than 200 boats can be passed in the

24 hours, or one in 7 minutes. The difficulties arise, not so much from the inability of the lock to pass the boats, as from the scanty capacity of the channel of the canal, which does not enable it to pass the water required. This difficulty will be aggravated as the boats shall increase in number, for they will accumulate more frequently and in larger masses in the channel of the canal, and no relief whatever will be afforded by doubling the locks without enlarging the channel. The breach above mentioned as taking place in April last, occurred near Alexander's lock, but so much was the level obstructed by the crowd of boats that only 76 could be passed on the day the breach was repaired; 119 on the second day, 152 on the third, and 210 on the fourth; having gradually increased as the crowd was dispersed. At the breach which took place on the long level at Frankfort, in May 1839, a crowd of boats, more than ten miles in length, was accumulated; and it was ten days after the breach was repaired before the navigation could be entirely relieved.

It is impossible wholly to guard against interruptions in the use of a work so defective as the present canal. Breaches will inevitably occur, and it must be expected that as the number of boats shall increase, approaching nearer and nearer to the maximum capacity of the canal, every interruption to the navigation, however slight, will be more and more sensibly felt. It may be confidently predicted that when the average number of the lockages shall rise as high as 200 daily, the canal will be so much obstructed that a portion of the trade will be compelled to seek some other avenue to market.

The number of lockages is governed exclusively by the quantity of tonnage which descends, and is not affected by that which ascends the canal. The weight transported from the interior to the tide water, greatly exceeds that which is carried from the tide water into the interior, being in the proportion of at least 4 to 1, so that the same boats which bring down the descending tonnage are able to transport the return cargoes. Being obliged to return and to pass through the locks, whether loaded or empty, the ascending boats do not increase the number of lockages; but each descending boat necessarily makes two lockages, one on its way down, and the other on its return.

From this view of the subject, it will be obvious that the question of the time when the maximum capacity of the canal will be reached, does not depend upon the rate at which the revenue may increase; for much

of that increase may and probably will be derived from the ascending trade; nor does it depend upon the rate of increase in the value of the commodities brought down. An accession to the descending tonnage of 100,000 tons of lumber or coal, paying in tolls but sixty thousand dollars, will obstruct the navigation as effectually as the like quantity of flour or wheat, paying three hundred thousand dollars. On the other hand 200,000 tons of merchandise might be added to the ascending tonnage, and pay in tolls six hundred thousand dollars, without obstructing the canal at all.

If the average weight of the descending cargoes be taken at 45 tons (and from the facts above stated, that is rather above the true amount,) every 45,000 tons added to the present descending tonnage, will require 1000 boats, which will pass the locks once in descending and once in ascending, thus making 2000 lockages. If these should be distributed equally through the 228 days of navigation, they would produce a daily accession of $8\frac{77}{100}$ lockages; but if the 45,000 tons should, and it doubtless would be distributed, like the rest of the trade, unequally through the season, the daily accessions which it would produce in the crowded months of May and October, would be correspondingly increased, swelling the number from $8\frac{77}{100}$ to at least 11 daily. In the same proportion, an accession of 90,000 tons would increase the daily lockages to 22; 135,000 tons to 33; 180,000 tons to 44; and 225,000 tons to 55; which latter amount added to the present daily average of 155 for October, carries the total beyond the maximum capacity of the canal.

The inquiry then is narrowed down to a single question; at what time is it probable that 225,000 tons will be added to the present descending tonnage of the Erie Canal?

In answering this question, it may be necessary to advert, in some degree, to the prospective revenue of the canal, a subject which has heretofore given rise to considerable difference of opinion.

The extent of disagreement on this point, so far as it has been exhibited in official communications to the Legislature, will be ascertained by referring to,

1st. The report of the committee of ways and means of the Assembly in 1838, (Ass. Doc. of 1838, No. 242,) in which the annual increase in the revenue is estimated at $100,000 for the four years ending with 1842; at $200,000 for the four years ending with 1846; and

at $300,000 for the three years ending with 1849, reaching in that year $3,000,000.

2d. The report of Mr. Paige, one of the finance committee of the Senate of 1839, (Senate Doc. 1839, No. 101,) which estimates the rate at an aggregate of *ten* per cent for successive periods of *six* years each until the year 1886, being a fraction over $1\frac{1}{2}$ per cent annually, amounting until 1844 to about $21,000 annually, until 1850 to $26,000 annually, and with that progression for 36 years thereafter, when the amount is estimated to reach $3,031,032.

3d. The report of the Canal Board, of April 11th, 1840, above referred to, (Ass. Doc. of 1840, No. 306,) which estimates the increase at 49 per cent for the next *seven* years, or 7 per cent annually, or 75 per cent for the next *ten* years, or $7\frac{1}{2}$ per cent annually, which carries the revenue in the year 1846 to $2,632,672.

The increase during the last year, as is stated in a former part of this report, was $159,365.15 or $9\frac{35}{100}$ per cent, and it may be confidently expected, that the revenue to be realized in the next three or four years, will abundantly sustain the most favorable of the estimates above referred to.

For reasons which are above stated, it will appear, however, that the increase in the revenue of the canal will not necessarily be attended with a similar increase in its descending tonnage; while on the other hand, it is by no means impossible that the descending tonnage may increase more rapidly than the revenue.

In the absence, however, of other modifying causes, and especially if the view shall embrace a series of years, it may be expected that the increase of the revenue and of the descending tonnage will vary but little from each other.

If then, the scale adopted by the Canal Board for estimating the increase of the revenue, should be applied to the descending tonnage and consequently to the lockages which it will occasion, it will be seen that it would require but a short time to carry the lockages to a point where the navigation must suffer serious interruption. The rate of $7\frac{1}{2}$ per cent annually, if continued for 4 years, will amount to 30 per cent; and that if added to 125, (the present daily amount of the May lock-

ages,) would swell the number to 162 daily; and if added to 134, (the present daily average of the October lockages,) it would increase the number to 174 daily.

In view, however, of the greater fluctuations to which the descending tonnage is liable, produced as they may be by causes which would exercise but little influence on the total revenue, the Commissioners do not deem it safe to assume the increase of revenue as a basis in estimating the increase of lockages. In truth it is not necessary that any precise rate of increase should be established for the descending tonnage; still less that the rate, if established, should be extended far into the future. It has been shown above that there is a fixed and absolute quantity, to wit, 225,000 tons, which if added to the descending tonnage, will exhaust the remaining capacity of the canal, and the inquiry is therefore limited strictly to the question, How soon will that particular quantity be added to the present descending tonnage?

It will be obvious that no means exist for fixing with much precision the period when this quantity will be added, liable as it is to be affected by the ever varying vicissitudes to which the commerce of the country is exposed.

That the time may arrive very speedily is not impossible, and indeed not very improbable; while on the other hand, causes similar to those which in the last few years have affected the business of the canals, may again produce similar effects.

In the judgment of the Commissioners, the probabilities are clearly in favor of a speedy accession of the quantity in question, to the descending tonnage. Without attempting minutely to explore the numerous and increasing sources from which this accession is to be expected, or to enter at large into the interesting details of such an inquiry, they submit the following general considerations as the grounds of their opinion.

1st. That even in our own State, an increased demand for bulky articles, such as lumber, coal, salt or gypsum, may speedily throw upon the canal a considerable portion of the quantity in question.

2nd. That several important canals are now completed, or near their completion, in the States adjacent to the western lakes, which will connect those lakes with extensive, productive and populous portions of

the interior; and that the population even in those States whose public works are suspended, is rapidly increasing in the vicinity of the lakes, and through them will obtain ready access to the Erie canal.

3rd. That among these works, which will soon be brought into operation, stands pre-eminent the Wabash and Erie canal, extending into one of the most fertile portions of Indiana, and commanding the trade of a rapidly increasing population, already exceeding 250,000 in number.

The exports to be carried to Lake Erie upon this canal, are estimated by judicious persons in that State, to amount at present to 100,000 tons. The grounds of that estimate, with other interesting particulars in respect to that canal, will be found in a communication from Mr. Williams, chief engineer of Indiana, which is herewith furnished, document A.

4th. That the Miami canal which is connected with the Ohio river at Cincinnati, is now in rapid progress towards Lake Erie. Its tonnage in 1838 was 54,000 tons, and is doubtless increasing with the growth of the country through which it passes. Important information in respect to that and the other canals of Ohio connected with Lake Erie, will be found in the letter from Mr. Leander Ransom, one of the Canal Commissioners of that State, furnished herewith, document B.

5th. That a test of the power of those works, when put in operation, to contribute tonnage to the Erie canal, is furnished by the fact that the quantity which in the year 1839 was transported on the Ohio canal

to Cleveland on Lake Erie, was	93,100 tons
And in 1840,.....	140,166 "
Showing an increase in one year of.....	47,066 tons.

It is to be borne in mind, however, that there exists a rival channel, which may divert through the Canadas a portion of the lake tonnage. The Welland canal, during the last year transported, it is said, about 50,000 tons, most of which was drawn from the States bordering on the lakes.

6th. That a further test is furnished by the returns of the cargoes weighed at Rochester, and where the first weigh-lock west of Lake

Erie is situated, showing the increase at that point to be 56,362 tons in a single year, equal to one-fourth of the quantity in question.

Impressed by these and other similar considerations, the Commissioners have become satisfied, that the time is rapidly approaching, when the capacity of the Erie canal, as a channel for the descending trade of the interior, will be entirely exhausted; that in the mean time its navigation must be exposed to serious and constantly increasing embarrassments; and that its speedy enlargement, at least in its most crowded portions, is now called for, not only as a measure of fiscal and commercial expediency, but of immediate and vital necessity.

REPAIRS OF THE ERIE CANAL.

The Acting Commissioner, to whose charge was assigned that portion of the Erie canal, between Albany and Little-Falls, on entering upon the duties of the office, found 58 sections, averaging a fraction over one mile in length each, under contract for enlargement, with nearly all the mechanical structures located on them. More or less work had been performed on all these contracts. Eight old culverts had been taken up during the winter, and others in their stead were in progress, which it was necessary to complete before navigation could be resumed. On many of the sections considerable quantities of old bank has been taken out, rendering it necessary to let in the waters against new banks, in part recently formed, all of which however had been done with as much regard to the safe opening of the canal, as was compatible with the economical prosecution of its enlargement. Added to these causes for apprehending difficulty in opening the canal, were the effects of a freshet, produced by the heavy rains of February last, which carried away the feeder dam, across the Mohawk river at Little-Falls, and a part of the dam across the Indian Castle creek, the latter of which it was necessary to rebuild before the canal could be rendered navigable, and the former before the spring floods had subsided, so as to ensure a supply of water to feed the canal.

By the active efforts of the chief engineer and the resident and assistant engineers and superintendents, added to the perseverance and energy of the contractors having the most difficult work to perform, the canal was rendered navigable on the 20th of April, and except the interruptions noticed below, its navigation was maintained until the 4th of December.

The aggregate length of the several pieces of enlarged canal brought into use last spring, was about eight miles, and no failure or interruption to navigation has occurred on any part of it, or work incident to it, except at a point about two miles west of Schenectady. At that point a breach was made by the failure of a temporary wooden aqueduct, which had been constructed during the previous winter and spring, to carry the navigation over a culvert pit, to enable the contractor to build the culvert during the summer.

The failure of this aqueduct was in part caused by the embankment and puddling connected with it, not having become sufficiently settled and permanent before the canal was filled with water, the contractor having been prevented by early high water in the Mohawk river, from performing the work, as early as he otherwise would have done.

This breach occurred on the 29th of April, and was not repaired until the 6th of May. Immediately after it occurred, the water in the Mohawk river rose so high as to cover all the ground from which material could be taken to repair the breach, and it did not subside until the third day thereafter.

Much credit is due Messrs. Yates, Burnham and Brown, (the latter the culvert contractor, and the two former the section contractors in the vicinity,) who, as soon as requested, promptly repaired to the breach, and employed all the force and tools on their respective jobs, together with as many teams and men as could work to any advantage, day and night, under their personal superintendence, until the navigation was restored, although the weather was inclement nearly the whole time. During four days of the time occupied in repairing this breach, the water in the Schoharie, Spraker's, Canajoharie, and Fort-Plain creeks, was so high that boats could not pass those streams.

To remove deposites from the canal, made by the streams that flow into it, navigation was suspended two days, from the 5th to 7th of June.

On the 19th of June the bottom timbers failed in the trunk of the aqueduct at Van Slyck's; and it became necessary to put in new timbers over one space between the piers, which caused an interruption to navigation one day.

On the 14th of September the water was drawn off the eight mile level, to remove the deposites washed into the canal, near the lower Mohawk aqueduct, from the adjacent clay and quicksand side-hill.

On the new Cohoes line of the enlarged canal, a large side-hill excavation and embankment are to be made on section 10, opposite the village of Cohoes. This embankment is to occupy a portion of the old canal, and the site of one of the old locks, which rendered it necessary to construct a short piece of temporary canal and a lock, so as to provide for the navigation at this place, during the last season of construction of the new canal. The temporary canal and wooden lock were constructed during the season of 1839. On the 19th of October last, the water was drawn from that level, to take out the bank between the old and the temporary canal, so as to turn the navigation through the wooden lock, to enable the contractor to prosecute his work as fast as was requisite to warrant its completion as soon as the residue of the line. This caused a suspension of navigation one day.

One of the lock gates in the first lock south of the lower Mohawk aqueduct, was displaced and otherwise damaged, on the 18th of November, by a boat coming in contact with it when shut, and while the other was open, which caused a suspension of navigation for about twenty-four hours.

The dilapidated condition of the old locks, aqueducts, and other mechanical structures, has rendered necessary considerable repairs, during the last season; and it will be with difficulty that some of them can be maintained till the new structures on the enlargement shall be finished. The walls of many of the locks have been pressed in by the frosts so much, as barely to admit of the passage of boats. It became necessary, last spring, to take down the masonry of one side of a lock near Cohoes, and to substitute a side of timber and plank, in order to obtain sufficient width in the chamber for boats to pass through it.

The expenses of repairs during the last season, between Albany and Little-Falls, have not exceeded those for the preceding season, except that for rebuilding dams carried away by the freshets of last winter and spring. One repairing scow and several lock gates have been constructed.

NAVIGATION OF THE ERIE CANAL.

The bottom of the Erie canal from Little-Falls to New-London, for the greater part of the distance, was thoroughly cleaned out, and an unusual depth of water has been maintained throughout the season of navigation.

Two interruptions occurred in the navigation of this part of the canal, in consequence of making two canals around the sites to be occupied by two of the new locks; and one other was caused by the failure of an old culvert near the village of Frankfort; the interruptions thus occasioned to the navigation, occupied in all, about two days.

The aqueduct at Oriskany required a new wooden trunk, which has been supplied; the towing path bridge to this structure should be replaced by a new one before the opening of navigation. The aqueducts at Fulmer's and at Ferguson's creeks will also require new towing path bridges next spring.

A few days after the opening of navigation, the east lock at Macedon was found to be in an unsafe condition, and the opportunity was embraced, during the suspension in the Mohawk valley, to draw the water from the lower level and repair the lock, by which the passage of a few boats only, was interrupted for a short time.

On the second day of June last, the south wing wall of the old lock at Lodi, at the west end of the Rome level, gave way, by which the passage of boats was interrupted about ten hours; and on the 15th of that month, one of the lower gates of the same lock failed, which caused a suspension of navigation about thirty hours. These are the only interruptions to the navigation of the Erie canal which occurred between New-London and Cartersville, during the last season. The new locks at Lodi and East-Macedon, are located by the side of the old ones, and in excavating the pits, the earth which constituted the main support of the walls, was removed. The inner face of these walls was laid up in single courses of stone, with a backing of rubble masonry, filled in behind, without any bond or connection between them; and on removing the earth by which they were supported, they were found too feeble to sustain themselves against the lateral pressure of the water, and the movement of heavily loaded boats. The location of the new locks at a little distance from the old ones, would have prevented these interruptions to the navigation, and saved a considera-

ble expense in sustaining the old locks while the construction of the new ones was in progress.

There are on the Erie canal, between New-London and Cartersville, 20 locks, 23 waste-weirs, 93 road bridges, 20 towing path bridges, 40 farm bridges, 13 lock houses, 9 watch houses, 12 aqueducts, 56 culverts, 5 feeders, 1 work shop, 1 timber shed, 1 piling machine, and 1 weigh-lock. A large portion of these structures have received considerable repairs, and some of them have been rebuilt during the past year. The machinery in the weigh-lock at Syracuse, was twice broken, and repaired at a heavy expense. Old docking to the extent of seventeen miles has been repaired, and seven and a half miles of new docking laid down.

The towing path had been worn down on the inner side, giving to its surface an inclination towards the canal, into which the materials of the bank were continually precipitated. In repairing and raising the towing path, the slope of the surface has been reversed for the distance of about sixty miles on this division of the Erie canal. An attempt has been made to prevent the towing path from again wearing down in like manner, by inserting in its front angle, a course of scantling, embedded and secured by short ties in the bank, and presenting the edge to the surface. This experiment has been made for the distance of five miles, near the west end of the Rome level, and appears to answer a valuable purpose; and should it continue to fulfil the expectation which induced its trial, it will probably be deemed good economy to introduce it on the canals generally.

The navigation of that part of the canal from the Irondequoit embankment to Buffalo, has been maintained with less interruption than usual. No breach has occurred from the opening to the close of navigation.

During the year considerable repairs have been necessary to the locks at Lockport. The face of the centre wall of one of the south locks was taken down and rebuilt, which occasioned some little delay in the passage of boats, one tier only being used for ascending and descending. The face-wall of another lock will require to be taken down and rebuilt before the opening of navigation in the spring.

Fears were entertained that the walls of the north tier might be endangered by the excavation of the pits for the new tier now in pro-

gress on the north side. They have been supported by strong timber braces, extending from the walls over the new pits to the opposite bank, and no new indications of failure have since been exhibited in consequence of the excavation.

The weigh-lock at Rochester is in a failing condition; the foundation has settled, and the timbers are considerably decayed, so that frequent repairs have been necessary during the season. The race discharging the water from the lock has in part been taken up and repaired, for which purpose it became necessary to draw the water from the mill-race.

Although in a decayed condition, the old aqueduct over the Genesee river, it is believed, may be sustained until the new one shall be finished.

From Cartersville to Lockport, for a considerable portion of the distance, the banks have been raised, strengthened and docked, with timber, in order to maintain the required depth of water. The water-way, at some points, is considerably diminished by deposites from the berm side; but it is believed that a greater and more uniform depth has been maintained during the season than for several preceding years.

From Lockport to Pendleton, through the deep earth cutting in the mountain ridge, the obstructions to the flow of water are serious and constantly accumulating. Quicksand to some extent exists, which, with the other deposites from the banks, requires the frequent use of an under water excavator during the season of navigation. The water grass, which grows rapdily on that section of the canal, and to the height of several feet in a short period, has been cut five times during the season and removed from the canal.

The guard-lock at Pendleton is in a dilapidated condition, and should be rebuilt without delay. It is contemplated to change its location about two miles north, to a point where a permanent foundation can be secured. A new towing path bridge is required over the Tonawanda creek at Pendleton, but as a change in the line of the canal at its entrance into the creek is contemplated, which will occasion a change in the location of the bridge, it can not be constructed until a portion of the section work shall be performed.

The towing path along the Tonawanda creek has been raised and gravelled for a considerable distance, and about 1,200 feet of docking timber laid.

A new change bridge has been constructed below Black-Rock dam, the location changed, and about 1,100 feet of new towing-path above, and some 1,300 feet of berm bank made below the bridge.

A wall 720 feet long has been built in the rear of the towing-path, along the harbor, to guard against the slide bank.

The wall commenced the season previous above the intersection of the Buffalo canal with the harbor, to protect the canal from the sand carried in by the wind and waves of the lake, has been raised, and extended about 1,300 feet.

The Black Rock pier, for about 200 feet, has been raised 2½ feet 32 feet wide, and flagged with broad massy stone; for about 800 feet it has been raised 3 feet, to the width of 16 feet, and flagged in like manner. Other portions have been repaired and strengthened for about 1,500 feet in length, and raised several feet.

The canal has been widened 6 feet, and docking put in seven timbers high, 580 feet in length, between Commercial and York-streets in the city of Buffalo.

The improvement of the Tonawanda and Oak-Orchard Creek feeder was completed in October last. The amount expended on that work is $19,078.60.

The works constructing for the purpose of draining certain lands along the Tonawanda and Ellicott creeks, directed by chapter 247 laws of 1838, are nearly completed, The work on the south side of Tonawanda creek is finished, and that on the north side will be completed next spring.

The amount paid up to January 1st, 1840, was.....	$57,065 21
Paid since that date, ...	26,749 44
	$83,814 65

Required to complete the work, $7,037.73.

The dam across Scajaquady creek and the channel from thence to Cornelius creek, directed by the laws of 1840, chapter 308, so "as

to drain the lands above said dam, overflowed by reason of the back water from Black-Rock harbor," has been put under contract, and is to be completed by the first day of October, 1841. The cost, at contract prices, is $10,532.02.

ENLARGEMENT OF THE ERIE CANAL.

A particular description of this important work with full details as to the extent and cost of its respective portions which had been put under contract, and of the work done up to the 11th day of April 1840, is contained in the report made on that day to the Assembly by the Canal Board, (Assembly Doc. 1840, No. 306,) and to which the Canal Commissioners now beg leave respectfully to refer.

Since the date of that report and during the year just closed, the construction of the work has been advanced more rapidly than in any previous season. The suspension of the public works in several of the other States, and the low prices of provisions in this, has produced the natural effect of reducing the price of almost every kind of labor and materials required on the canals. The season has, moreover, been unusually propitious for performing work of this kind, so that a much larger amount has been performed than was contemplated by the last annual report of the Commissioners.

The line between Albany and Little-Falls, (88 miles,) is divided into eighty-six sections of nearly equal length, their numbers commencing at Albany. Fifty-seven of these sections, with the mechanical structures incident to them, are under contract. The location of the 29 sections not under contract, will be indicated by stating their numbers, which are as follows:

Numbers 15, 16, 17, 18, 27 and 28, between the Lower Mohawk aqueduct and the city of Schenectady; 30, 31, 32, 33, 34, 36, 37, 38, 39 and 40, between Schenectady and Port Jackson; 48, 49 and 52, between Port Jackson and Fultonville; 58, 59, 60, 61, 62 and 63, between Fultonville and Spraker's Basin; 76, 79, 80 and 83, between Fort Plain and Little-Falls.

The estimated cost of work under contract between Albany and Little-Falls, may be briefly stated as follows:

57 sections—quantities est'd, will cost at contract prices,	$2,271,943
32 double, 6 single, 2 comb'd, and 1 weigh-lock do	2,810,519
Carried forward,	$5,082 462

Brought forward,		$5,082 462
10 aqueducts,	do	860,770
66 culverts,	do	293,128
93 bridges,	do	291,176
9 waste-weirs,	do	25,654
2 feeders, including dams and bulk-heads.	do	86,135
Miscellaneous,		91,500
		$6,730,825

The amount paid on this work during the fiscal year ending September 30th, 1840, is as follows:

On sections,	$529,690 71
Locks,	864,572 42
Aqueducts,	282,888 08
Culverts,	101,266 57
Bridges,	66,026 35
Waste-weirs,	4,700 00
Bulk-heads,	8,612 39
Feeders,	9,600 00
Engineering,	37,235 62
Miscellaneous,	55,855 47
	$1,960,447 61
There has been paid since 30th September last, on work performed up to December 15th,	493,488 71
Total amount paid since 30th September, 1839,	$2,453,936 32

Amount paid by late Commissioner,	$711,425 83	
do do present do	1,742,510 49	
		$2,453,936 32

There remains to be paid for work to be performed, now under contract, between Albany and Schenectady,	$910,015 00
And between Schenectady and Little-Falls,	1,023,946 00
Total between Albany and Little-Falls,	$1,933,961 00

The contracts for all that part of the work between Albany and Schenectady, except the lower Mohawk aqueduct, expired on the 15th of

October last. The contracts for the work between Schenectady and Little-Falls will expire on the 15th of October next.

On the 13th of April another breach occurred in the coffer dam between the water in the Albany basin and the pit of lock No. 1, similar in magnitude to that in January, 1839. The delay experienced in repairing this breach, clearing the pit from water, and restoring the work to its previous condition, prevented the contractor from laying much masonry till after the 1st of July. Since that time he has made great progress. The masonry is now carried up to the height of 13½ feet, which is above the ordinary floods of the river; and no further casualty is apprehended that will prevent these locks from being completed in time for use in the spring of 1842.

It is expected that the section work from No. 1 to 6, passing the village of West Troy, will be completed below top water before navigation is resumed next spring; and what will remain to be done above water, can be completed early next season. The full depth of water cannot be raised, however, on the first level, from lock 1 to 2, which is about one mile in length, until the new double lock, No. 1, shall be completed.

There will be 5½ feet of water on the second level, from lock 2 to 3, about 5¼ miles in length, on resuming navigation next spring. The remaining 18 inches cannot be raised until the completion of lock 3, which is situated at the junction of the Champlain with the Erie canal, and at the south end of the new Cohoes line.

The masonry of the new weigh-lock, at Albany, is more than half laid up, and will be completed early next season. In order to finish the weigh-lock house and scales, by the spring of 1842, they should be put under contract during the present winter, or early next spring.

The single lock, No. 2, is located by the side of the old lock. It was completed during the season of 1839, and has been in use, to some extent, during the last season.

The contractors for the combined locks, at the new West-Troy side-cut into the Hudson river, have completed the masonry of the lower lock, and will finish the other, together with the side-cut, next season.

The two enlarged locks on the upper West-Troy side-cut, which are to be single, and the new weigh-lock at that place, are not under contract. The weigh-lock is to be located parallel with the enlarged canal, on its berm side, so as to be entered from either direction. The upper side-cut lock will be placed on the site of the present weigh-lock; so that it will be necessary to complete the new weigh-lock before the upper side-cut lock can be commenced. The old weigh-lock cannot be dispensed with till the new one shall be ready for use.

In order hereafter to avoid an impediment to the navigation, and a very considerable annual expenditure, in removing a heavy bar that has been formed every season by the confluence of one of the sprouts of the Mohawk with the Hudson river, opposite the point where the side-cut enters the latter stream, the lower lock is to be carried out beyond the place where this bar is formed. From the contingencies incident to that location, more time will be required to construct the lower lock, with economy, than either of the others.

To complete this connection of the canal with the Hudson river by the spring of 1843, the whole should be put under contract early next season.

Sections 7 to 11, inclusive, embrace the new Cohoes line, about five miles in length. Three of these sections are completed, and the work on the others, except 10, is in an advanced state. On section 10, a heavy side hill excavation and embankment are to be made, which the contractors are now vigorously prosecuting. On this new line, locks 3 to 18 are located, which are all double. Six pair of them are completed, except the gates, viz. Nos. 6, 9, 11, 12, 13 and 14; the other ten pair are all in a forward state, except Nos. 3 and 15, on which about one half of the work is done.

It is believed, that with proper energy on the part of the contractors, all the work on this line, can be completed next season, in time to admit the water, and test its permanency, before the close of navigation, so that it can safely be brought into use in the spring of 1842.

By adopting a new line at this place, the advantage has been obtained, of placing the new locks at farther and more equal distances apart, than those on the old line. By changing and increasing the lifts of some of them, three in number have been saved.

On the old line, at several points, the locks are placed in such close proximity to each other, as materially to incommode the navigation. The distance between several of them, does not exceed 120 feet. The shortest distance between any of the new locks, will be 620 feet, and the width at the surface of the water on the shortest reaches, is enlarged to about 100 feet, so that the water in none of them will be depressed or elevated more than four inches, by discharging or filling a single lock. The navigation will be much relieved, at this difficult point, when the new line shall be brought into use.

The level extending from lock 18 to 19, embraces sections 12 to 18 inclusive, and the lower aqueduct over the Mohawk river, sections 12 and 13 on the south, and 14 on the north side of the river, and the aqueduct are under contract. Sections 15, 16, 17 and 18 are not under contract: 12, 13 and 14 are in a forward state, and can be finished next season.

The lower aqueduct over the Mohawk river has 2 abutments, 25 piers, 26 arches (to support the towing path) of 38 feet span each, and 1160 lineal feet of trunk, 40 feet wide in the clear. The bottom of the trunk to be 16 feet above the ordinary height of the river. This work has been prosecuted with great vigor during the past season. The masonry in the abutments and a number of the piers, is carried up to canal bottom. The remainder of the piers are all above the ordinary height of water in the river, and two of the towing path arches are turned. The masonry, in all cases, has been commenced on rock foundation. Under most of the piers the rock was found, at or near the surface of the bed of the river, but under several of them it was covered with gravel and cemented earth, to the depth of from 12 to 16 feet.

The materials to finish this aqueduct have been mostly procured, and a large portion of them are delivered in the vicinity of the work. There now remains to be performed, on this important structure, a less amount of work, than has been done during the last season, and there is no contingency likely to happen, that will prevent the contractor from completing it in time for use in the spring of 1842. The total cost of the aqueduct will be $306,268.00; on which there has been paid $229,758.00.

The four sections, 15, 16, 17 and 18, not yet under contract, must be completed before the increased depth of water can be attained between locks, 18 and 19.

Sections 19 to 25 inclusive, are under contract, and the whole are nearly completed, together with four pair of locks, 19, 20, 21 and 22, which are located on them. What remains to be done on this portion of the line, east of lock 21, (which is about six miles in length) will be finished in time to bring into use the enlarged canal, with nearly the full depth of water, next spring. By a change of the levels, the two locks, 19 and 20, are substituted for three of the old locks. Locks 21 and 22, located on the north side of the Mohawk river, are to be substituted for three of the old locks. The masonry has been finished during the last season, but the locks cannot be used till the upper aqueduct over the Mohawk river shall be completed, as they are on a short piece of new canal connected with the new aqueduct.

The upper Mohawk aqueduct is a structure similar to that over the same stream below, except that it is not as long. It has 2 abutments, 13 piers, 14 towing path arches 38 feet span each, and 620 lineal feet of trunk 40 feet wide in the clear, the bottom of which is 17 feet above the ordinary height of the river. The cost of this structure will be $201,467.00, of which there has been paid $171,131.61. Except three of the piers, the masonry is carried up above canal bottom, eleven of the arches are turned, and a part of the trunk timbers have been secured in their places. The whole structure may be completed before the close of another season.

The two old aqueducts over this stream have been maintained under doubtful circumstances for several years. When those now in progress shall be finished, all future apprehension for the safety of the navigation, at these points, will cease.

On section 25, a feeder from the Mohawk river enters this canal, which furnishes a supply of water to its junction with the Champlain canal. The new bulk-head on this feeder has been completed, and the water turned through it during the last season.

Section 26, on the south side of the Mohawk river, is in an advanced state, and can be finished next season; 27 and 28 are not under contract.

Section 29, passes through the city of Schenectady, and is under contract. The enlarged canal through this city, is to have but 60 feet width of water at the surface. The sides are to be formed of cemented stone masonry, laid nearly vertical. Most of this wall on the towing

path, and a small amount on the berm side are laid. It is expected that the whole will be completed to above top-water, and the old towing path taken out during this winter and next spring, which will give the full width of the enlarged canal at this place, next season.

The width of the old canal, through a part of the city of Schenectady, is only 30 to 32 feet, and at some points, where the sides have been pressed in by the frosts, it is still less. Frequently during the last season, boats have been wedged in at these narrow places, and have caused considerable detention. Sections 30 to 34 inclusive, are not under contract.

The culvert on section 31, near Schenectady, at which the breach occurred last spring, the contractor is now engaged in constructing. To repair the breach it was found necessary to fill up the culvert pit, which had been excavated.

During the past summer the wings of the culvert and part of the arch at each end have been laid up, and since the close of navigation the contractor has again excavated the pit. The materials are all delivered to complete the residue of the arch, and the whole is to be finished before navigation is resumed.

Lock 23 is located on section 32, and the masonry, except a part of the coping, is laid. This pair of locks will be finished early next season, but can not be used till the section work connected with them shall be finished, which is not yet under contract.

Lock 24, to be located on section 33, is not under contract. The aqueduct over Van Slyck's creek, on section 34, is under contract and is so near completed that what remains to be done can be finished early next season; but it can not be used till the section work connected with it is finished, a part of which is not under contract.

This aqueduct has two abutments and two piers, on which is to be laid a wooden trunk, 84 feet long and 50 feet wide in the clear; the spaces between the abutments and piers are 22 feet each in the clear.

Section 35 is under contract, and about one half of the work has been performed; the contractor is proceeding with the residue as rapidly as is desired.

Sections 36 to 40, inclusive, are not under contract. Lock 25, on section 38, is under contract, the stone are nearly all prepared, and the masonry will probably be completed next season.

Sections 41 to 47, inclusive, are under contract, and are heavy sections; 41, 42 and 43 pass the rock bluffs at Flint Hill and Van Olinda's, and 44, 45 and 46 embrace some river work; 47 commences at Port Jackson, extending west along the base of "Yankee Hill," and is enlarged almost entirely on the river side. The banks of all these sections are nearly formed, and protected by a wall as far as they are exposed to the action of the river.

Locks 26 and 27 are located on section 44. The masonry in lock 26 has been completed, and that in 27 has been commenced and the stone have been prepared to finish it.

An aqueduct on section 44, called "Phillips' aqueduct," has been nearly completed during the last season. It has two arches, each of 18 feet span.

The Port Jackson aqueduct has also been completed, except a small portion of the upper wings. This aqueduct has 4 arches of 18 feet span each, on which embankments are to be formed, so that the full depth and width of water in the canal will be maintained over this, as it will also be over Phillips' aqueduct. The aqueduct at Port Jackson will be completed in time for use next spring.

Sections 48 and 49 are not under contract. These are heavy sections, and will require energetic contractors to complete them in two years.

Sections 50 to 57 inclusive, extending to Fultonville, are under contract, except 52, a light section east of Schoharie creek. All this work has progressed as fast as has been required.

Lock 28 on section 49, is in an advanced state, and can be completed next season.

Locks 29 and 30, on section 51, are to be substituted for three of the old locks, and may both be finished next season.

Schoharie creek passing through the channel of the old canal, is to enter the enlarged canal as a feeder, at the foot of lock 29.

The aqueduct over the Schoharie creek on section 51, has 2 abutments, 13 piers, 14 towing path arches of 39 feet span each, and 634 lineal feet of trunk, 40 feet wide in the clear; its estimated cost is $148,018.00, of which $122,472.00 has been paid. The contractor

has made good progress in this work, during the last season, and will probably finish it next season.

An aqueduct is also in progress over Auries creek. The pit has been excavated. The contractors are now engaged driving the piles on which the masonry is to be laid, and they will probably finish it next season. This aqueduct is to have 4 stone arches of 22 feet span each, on which an embankment is to be formed for the full depth and width of the water in the canal.

Sections 58 to 63 inclusive, a distance of nine miles, passing the rocky bluff at the "Nose," and extending from Fultonville, to Spraker's Basin, are not under contract; 58, 61, and 63, are heavy sections, em bracing considerable rock excavation and river embankment.

In order to obtain the necessary elevation to cross the Schoharie creek by an aqueduct, it became necessary materially to change the levels on sections 50 to 64. The canal bottom from Spraker's Basin to Fultonville, (nine miles,) is to be raised one foot; and from Fultonville to Schoharie creek (five miles,) it is to be raised eight feet; which, together with taking up the old lock on the west shore of Schoharie creek, and crossing that stream below the fall of the dam, gives the aqueduct an elevation above low water in the creek, of eighteen feet.

By these changes of levels, no part of the enlarged canal, from the second lock east of Schoharie creek to Spraker's basin, can be used till the whole is completed; of which, sections 52 and 58 to 63 inclusive, with the mechanical structures incident to them, are not under contract. They are estimated to cost $409,976.

Lock 31, near the east shore of Spraker's creek, can be completed next season, and will be substituted for the old lock at Canajoharie. This change became necessary in order to pass the Schoharie and Spraker's creeks by aqueducts.

The aqueduct at Spraker's creek, is to have 2 abutments, 4 piers, 5 towing path arches of 22 feet span each, and 138 lineal feet of trunk 50 feet wide in the clear; the masonry has been commenced, and can be completed next season.

The Canajoharie aqueduct is to be of the same dimensions, and to be built on the same plan as that over Spraker's creek. This aqueduct has been commenced and can be completed next year.

Section 64 to 86 inclusive, terminating at Little-Falls, are under contract, except 76, 79, 80, and 83. Sections 64 to 70 inclusive, a distance of six and a half miles, to Fort-Plain, can be completed and ready for navigation by the spring of 1842.

Single lock 32, on section 70, at Fort-Plain, is to be built by the side of the old lock, at that place. The old canal had double locks at this place, one of which has been taken down, and the new one is to occupy its site. The contractor is now engaged in driving the piles for the foundation. This lock may be completed next season.

The bottom level of the canal, west of this lock, is to be raised two feet, and east of it, one foot. The use of this lock, and the levels east and west of it, will depend on the completion of the new aqueduct over the Fort-Plain creek, the contract for which was declared abandoned last winter.

As so much of the line as was dependent on this aqueduct was in a forward state, and as the aqueduct would require two years to construct it with economy, it was advertised, and proposals received for its construction, on the 10th of December last; and a contract has been entered into for its construction to be completed in October, 1842. Its plan and dimensions are to be similar to those before noticed, on the two streams below, only that the stone on the face of the wall are not to be cut, except the pilasters, water-table, and coping.

The work is so far advanced on sections 71, 72, and 73, that they may be completed next season; but as the bottom level is to be raised two feet, on this part of the line, up to lock 33 on section 75, the enlarged canal cannot be used until sections 74 and 75, and the Fort Plain aqueduct, shall be finished, to accomplish which will require two years.

Double lock 33 has been completed during the last season, except the valve gates.

The work under contract from 75 to 83, can be completed in two years. Section 84 is a heavy and difficult one, requiring a large amount of rock excavation to be removed, and bottom and side lining to be put in, the most of which must be performed during the suspension of navigation. This portion of the line cannot be used until sections 76, 79, 80 and 83, and the aqueduct over Indian Castle creek, on section 80, shall be completed, which are not now under contract. The estimated cost of work not under contract between sections 75 and 84, is $263,523, and on its completion depends the use of about nine miles of the enlarged canal.

Double lock 35, on section 80, on the east bank of the Indian Castle creek, and about half a mile west of the old lock, (for which it is to be a substitute,) are on an independent line of canal for the enlargement. The foundation has been prepared for the masonry; the stone are mostly delivered; and the contractors will probably finish the masonry next season.

The contractors for sections 85 and 86, at Little-Falls, are vigorously prosecuting the work remaining to be done on their sections. The enlargement at this place, for about one mile in length, is to be completed before the reopening of navigation next spring.

Locks 36 to 39, inclusive, are on sections 85 and 86, at Little-Falls. The old canal at this place has five locks, of eight feet lift each. For the enlargement, the number is reduced one; but the aggregate lift remains the same: 36, 38, and 39 are single, and 37 is double. The new single locks, in each case, are constructed by the side of the old ones: 39 was completed in 1838, and the others in 1839. The canal adjoining 36 and 37 not having been finished, they have not been brought into use: 38 and 39 have been used. All these locks will be brought into use next spring.

The number of lift locks from Albany to Little-Falls, on the old canal, is 46; on the enlarged canal, 39—being seven less than on the old canal, viz: 3 at Cohoes, 2 at the upper aqueduct, 1 at Schoharie creek, and 1 at Little-Falls. Of these locks, 38 are under contract, of which 2 double and 4 single are finished, and the remainder will be finished next season.

The old canal is supplied with water at Little-Falls, by a feeder from the north side of the Mohawk river, which is carried over the river by a stone aqueduct. This feeder is to be maintained for the enlarged canal. The bottom of the short level into which it enters, is sunk two feet and four inches; and the surface of the water is to be raised eight inches.

This aqueduct is 18 feet wide in the clear; and, when the additional depth of water for the enlarged canal is raised, it will be four feet eight inches deep.

To obtain an additional supply of water at this place for the enlarged canal, a new feeder and bulk head of stone masonry have been constructed on the south side of the river. This work, except the culvert

to pass the water under the towing path, was completed in 1839. The culvert will be finished and the feeder opened next spring.

On this division of the enlargement there are to be 88 stone and 6 wood culverts, besides two discharging culverts for the weigh-locks, one at Albany, and one at West-Troy.

The sizes of the stone culverts are as follows, viz: One having an arch of 25 feet chord; two of 14 feet; two of 12 feet, with two arches, each; three of 12 feet, single arches; one of 11 feet; one of 10 feet with three arches; three of 10 feet with two arches each; one of 10½ feet; two of 8 feet with two arches each; eighteen of 8 feet with single arches, including the two for the weigh-locks; two of 7 feet; one of 6 feet with two arches; sixteen of 6 feet with single arches; one of 5 feet, and thirty-six of 4 feet. Sixty-one of these culverts are under contract, seventeen of which are completed, and most of the others have been commenced.

There were on the old canal, between Albany and Little-Falls, when the enlargement was commenced, 190 farm and road bridges, and 128 were estimated as being necessary on the enlargement. Contracts have been entered into for the construction of bridges, on sections, on which 90 of those estimated as being necessary occur, but no contracts have been made for the construction of bridges on sections, on which 38 of them were to be located. Of those under contract, 20 have been completed. There has been but a comparatively small number commenced the last season, and those mostly road bridges, and it is not contemplated to proceed in their construction hereafter any faster than will be necessary to complete them, as soon as the enlarged canal is ready to be brought into use at the points over which they pass; and no further progress will be made in the construction of farm bridges, until efforts shall be made to commute with the persons through whose lands the canal passes, where bridges are deemed to be necessary.

There were 15 waste-weirs estimated in the enlargement, of which 9 are under contract, and are located on each of the following sections, viz, 1, 6, 9, 11, 20, 22, 46, 74 and 84, all of which have been commenced and will be completed before it will be necessary to take up those on the old canal.

Besides those stated above, in all cases where aqueducts have wood trunks, waste gates are to be inserted, which will save the expense of separate waste-weirs on these levels.

Estimated cost of work remaining to be put under contract between Albany and Little-Falls.

29 sections making an aggregate of $31\frac{29}{80}$ miles,	$1,069,236
1 double, 8 single and 1 weigh-lock,	414,727
6 aqueducts,	113,225
29 culverts,	77,408
38 bridges,	114,386
6 waste-weirs,	17,862
2 weigh-lock, houses and scales,	33,200
26 lock houses,	19,500
Land damages, and buildings,	106,278
Engineering and superintendence,	110,000
	$2,075,822
Add amount remaining to be paid for work, now under contract,	1,933,961
Total to complete enlargement from Albany to Little-Falls,	$4,009,783

Of the 57 sections under contract between Albany and Little-Falls, making an aggregate length of $55\frac{51}{80}$ miles, only 26 miles can be brought into use with 7 feet depth of water, until other work not yet under contract is completed.

About six miles of the enlarged canal, two double locks, the Schoharie and Auries creek aqueducts and other smaller structures now under contract, cannot be used until about nine miles with the mechanical structures on it not under contract are completed.

The estimated cost of the former is	$508,310 00
And of the latter, on the completion of whic hthe use of the former depends, is	409,976 00

Of the remaining $49\frac{51}{80}$ miles now under contract, the water cannot be raised above that in the old canal on 23 miles, on which is located 1 single and 7 double locks; the 2 aqueducts over the Mohawk river and other mechanical structures, until $22\frac{1}{2}$ miles, 1 double lock and other smaller structures are completed which are not under contract.

The estimated cost of the former is	$2,059,722 00
And that of the latter, on the completion of which depends the use of the former, is	997,683 00

The following table will show the estimated amount necessary to expend on the work now under contract and that not under contract between Albany and Little-Falls, for the year 1841 *and January and February,* 1842, *in order to finish the whole line in time to bring it into use in the spring of* 1843.

	Estimated cost of work remaining to be done on the whole line, including that under contract.	Amount required in 1841 on the contracts.	Amount required in 1841 on work not under contract in order to complete it by the spring of 1843.	Aggregate amount required in 1841.
$55\frac{51}{80}$ miles of canal under contract and $31\frac{29}{80}$ not under contract, in all 87 miles,	$1,959,876	$800,000	$350,000	$1,150,000
32 double and six single locks, 1 weigh-lock and 2 combined locks for the new side-cut at West-Troy under contract, and 1 double and 6 single locks, 1 weigh-lock and 2 single locks, for the old West-Troy side cut, not under contract,	895,792	450,000	140,000	590,000
10 aqueducts under contract, and 6 not do	359,660	200,000	40,000	250,000
61 culverts under contract, and 29 not do	166,300	60,000	25,000	85,000
90 bridges under contract, and 38 not do	271,738	100,000	40,000	140,000
9 waste-weirs under contract, and 6 not do	32,616	14,000	5,000	19,000
2 weigh-lock houses and scales,	33,200	.....	16,000	16,000
26 lock-houses not under contract,	19,500	.....	10,000	10,000
Feeders, including dams and bulk heads,	54,823	30,000	.....	30,000
	3,793,505	1,654,000	626,000	2,290,000
Land, damages and buildings,	106,278	.....	40,000	40,000
Engineering and superintendence,	110,000	.....	40,000	40,000
	4,009,783	$1,654,000	$706,000	$2,370,000

No additional work has been put under contract between Little-Falls and Utica. The work on all the sections between these two points has proceeded as fast as the means at the disposal of the Commissioners would warrant.

The distance between these two places is twenty-three miles, divided into twenty-four sections of nearly equal length. Of these, fifteen continuous sections from No. 87 to No. 101 inclusive, with all the mechanical work connected therewith, are under contract. Section No. 102 was put under contract, but abandoned by the contractor. From section No. 102 to 107, the work has not been let. Sections No. 107, 108, 109 and 110, extending from near the Frankfort line through the city of Utica, with all the structures connected therewith, are nearly completed.

From this point west, for twelve and a half miles, extending nearly to the village of Rome, no work has yet been put under contract. Sections Nos. 123 and 124, embracing the new line, through the village of Rome, are under contract, and good progress has been made on the work.

The mechanical work under contract from Little-Falls to and including Utica, consists of three single and four double locks, and one weigh-lock, four aqueducts, sixteen culverts, four waste-weirs, and the requisite bridges, the number of which has not yet been determined.

Locks Nos. 40, 41 and 42, are the single locks, and are located adjacent to the old ones. The foundations of No. 40 and 42 have been commenced, but are not yet finished. The masonry on No. 41 has been commenced, and the walls have been raised about three feet high. No. 43, 44, 45 and 46, are double locks. The foundations for No. 43 are prepared, and the contractor will commence the masonry when the proper season arrives. The lock-pit has been commenced for No. 44, and the foundations will be put down early in the spring. The foundations have been laid and the masonry commenced on lock No. 45, at Frankfort village. Nos. 44 and 45 are two pair of locks of eleven feet lift each, which have been substituted for three single locks. This has made it necessary to cut a new channel for Myers' creek, and to alter its course so as to pass it under the canal above the locks last named. This change in the course of the creek prevents the necessity of deepening the old channel to the Mohawk river. The new channel, and the work connected therewith, is in a forward state.

The pair of locks No. 46, and the weigh-lock at Utica, are complete, except a small part of the coping and the gates; the aqueduct at the starch factory is finished. The John-street culvert, which is designed to discharge the waters from the weigh-lock in Utica to the Mohawk river, has been completed. Two other large culverts and several smaller ones have been finished; and all the others are in a state of considerable forwardness. The waste-wiers are all nearly finished. The bridges at Utica will soon be complete; and several between that place and Little-Falls are in a forward state.

It is highly necessary that all the work between Little-Falls and Rome, not now under contract, should be put under contract as soon as the work can be prepared. Until this part of the work shall be finished, the full benefit to be derived from the introduction of the Black River feeder cannot be realized.

There was expended by William Baker, during the last fiscal year,	$135,131 44
By S. Newton Dexter, up to the end of the fiscal year,	265,896 13
" do from the close of the fiscal year to January 1st, 1841,	100,407 87
	$501,435 44

The amount paid for work done between Little-Falls and New-London,	$ 707,536 00
The cost of the work under contract remaining to be done, estimated at contract prices, amounts to	873,752 00
The amount required to continue the work now under contract, during the present season, is estimated at	710,000 00
The work not under contract, between Little-Falls and Rome, above referred to, is estimated to cost about	600,000 00
Of which amount there will be wanted during the present year,	150,000 00

The work of enlargement from New-London to Cartersville has been prosecuted, during the past year, to the full extent of the means placed at the disposal of the Commissioner having charge of this part of the line. The aqueduct over the Oneida creek has been completed. One section for the enlargement of the prism of the canal connected with this aqueduct, together with four other sections, extending from

Lodi, through Syracuse, to the Geddes lock, are in progress, and are expected to be finished before the next commencement of navigation.

An enlarged lock, No. 47, at Lodi, was completed and brought into use last spring, and the fellow to it will be completed by the spring of 1843; and at number 48 a new lock had its masonry finished last fall, and will be ready for use next spring; and its duplicate is now in progress, and will be completed in the spring of 1842.

A pair of locks at Syracuse has been completed, and will be ready at the next opening of navigation.

The bridges at Oneida creek, Lodi and Syracuse are expected to be finished by the 1st of June next.

The surveys and estimates heretofore made for the enlargement between Utica and Syracuse, are not deemed sufficient for the purposes of a final location of that portion of the line; new and further surveys will therefore be necessary. That service can be performed before it will become necessary to place this part of the work under contract.

The cost of the work which has been put under contract, between New-London and Geddes lock, situated a mile and a half west of Syracuse, is estimated to amount, at contract prices, to $462,945; on which there has been expended $386,364; leaving a balance, necessary to complete the same, of $76,581.

Between Geddes lock and the Seneca river there is now under contract a distance of 11 miles and 51 chains, and a feeder from Nine Mile creek, and another from the Carpenter brook. The work here under contract commences about 12 chains east of Nine Mile creek and extends to a point nearly half a mile west of the aqueduct at Jordan village; about 11 miles is on a new line independent of the present canal. The Nine Mile creek feeder is one mile and 56 chains long, and the Carpenter brook feeder fifteen chains. The former is to be made navigable to the village of Camillus, a distance of one mile. This work was placed under contract in October, 1838, and although the sections, as well as the work upon the mechanical structures, are considerably advanced, the character of the materials remaining to be excavated, are not sufficiently developed to render them susceptible of a perfectly correct admeasurement and classification.

A large portion of the line is located in alluvial ground, very variable in its character. Considerable quantities of cemented sand and gravel, and some quick sand and slate rock have been found; and as there are indications of the existence of these substances in the remaining portions of some of the sections, an estimate of the aggregate cost is rendered somewhat less susceptible of precision. At contract prices, the estimated cost of this part of the work is $564,077.56, and the amount paid on the contracts is $326,037. Liberal allowances for the excavation of materials of the more expensive kinds have been made, and it is believed they will not occur in quantities so large as to swell the cost of the work beyond the amount stated in the estimate.

By the terms of the contracts this portion of the line is to be completed by the 10th day of April, 1841. But the work is not in as forward a state as it would have been, had more ample funds been placed at the disposal of the Commissioners; it is, however, sufficiently advanced to enable the contractors, with reasonable diligence, to complete it in season for use at the opening of navigation in the spring of 1842.

The work placed under contract, previous to 1840, between the Seneca river and Cartersville, consists in a single lock at Lyons, two single locks at Lockville, one single and one double lock at Macedon, together with the enlargement of short sections of the canal above and below the locks.

The aggregate cost of the last mentioned work, as estimated at contract prices, is $279,042.79; and the amount paid for work done under the contracts, is $209,657.79.

The lock at Lyons was completed and brought into use in the spring of 1839, and the east lock at Lockville on the opening of navigation last spring. The masonry of the west lock at Lockville is completed, and that of the east lock at Macedon is also nearly done. It is intended to hang the gates, and otherwise complete both of these locks and the short sections of canal connected with them, in season for use at the commencement of navigation next spring. The walls of the new double lock at Macedon are raised 10½ feet. The face stone are delivered, and it is intended to complete this lock and the enlargement of the canal between it and the east lock at this place in season for use at the opening of navigation in the spring of 1842. The aqueduct

over Mud creek, about one mile west of the village of Lyons, and the lock with which it is connected, have for some time past given such indications of failure as renders the time of their continuance in use very uncertain. The cause producing these indications is found in the decay of timbers upon which the structures rest. These foundations consist in part of timber piles, the top of which, together with some of the timbers they support, are above the surface of low water in the creek, and thus exposed to the action of the atmosphere. Although decay has taken place to such extent as to permit the walls to settle, and cause a displacement of the stone, and an opening of some of the joints in the masonry, no recent indications of sudden failure have been discovered. A renewal of these foundations, without removing the walls, is impracticable, and as the cause of failure is still in operation, and sooner or later will be certain in its effect, it was not deemed prudent to rely upon structures so frail for any greater length of time than will be necessary for the construction of a new aqueduct and lock.

These structures are situated upon a portion of the canal, the enlargement of which was rendered of doubtful policy, in consequence of the probable existence of a more favorable route for the enlarged canal. In view therefore of the importance of certainty in relation to the selection of the most judicious line, an examination was directed by the Commissioner in charge of that portion of the canal, which resulted in the adoption, by the Canal Board, of a new line diverging from the present canal at a point 27 chains above the new lock at Lyons, and extending west two miles and 20 chains, where it again unites with the present canal, near the public house of Calvin D. Palmeter. By this change of the line, the new lock and aqueduct will be separated. The lock is located about a mile and a quarter west of Mud creek, and in consequence of passing this stream upon a level 10 feet lower than that of the present canal, the former plan of crossing upon arches of masonry, will be changed, and an aqueduct, with a wooden trunk, resting upon stone abutments and piers, be substituted. The canal, on the new line, will be 34 chains shorter than the old one, and the estimated cost of its construction is $36,191.26, less than that of the enlargement of the present canal between the same points.

The change of the location of the aqueduct and lock, involved the necessity of completing the whole of the new line before these structures can be used. In view of the magnitude of the evils consequent

upon a failure of the old structures, and the constant hazard to which the navigation is exposed, public notice was given, on the third of October last, that proposals would be received until the 12th day of November, for the construction of this new line, together with all the necessary mechanical structures, including 15 chains of the enlargement of the present canal, extending east, and connecting with that portion formerly under contract, and four chains of the enlargement at the west end, necessary to bring the new line into use.

It is intended to have the work completed by the first day of August, 1842. Several of the contracts have been executed, and the preparation of materials for some of the mechanical structures is now in progress. Proposals were also received at the same time, for the construction, upon the enlarged plan, of a road bridge at Lyons, two road bridges and a composite culvert at Macedon, all situated upon portions of the canal previously put under contract. The old bridges have become so much worn and decayed as to require immediate rebuilding. The last mentioned work was formerly under contract, and had been abandoned by the contractors. The estimated cost of this work is $170,491, and the amount paid on the contracts, to January 1, 1841, is $1,380.

In August last, a small party was organized for the purpose of making the necessary surveys, preparatory to the location of the line of enlargement between Arcadia and Macedon. This service has been performed, and the calculations of the cubical quantities and the necessary plans, maps and profiles of the line surveyed, will be completed the present winter. A survey of the other parts of the line between Geddes and Cartersville had been previously made. In view of the importance of giving to the enlarged canal the utmost efficiency, by means of shortening the distance as much as can be done consistently, with a due regard to economy in the construction, a re-examination at some points in the line heretofore surveyed, has also been made the past season for the purpose of determining upon the propriety of deviations from the present canal, and for other purposes, affecting the economy of the enlargement. It has been supposed that the feeders from Nine Mile creek and Carpenter brook, now in progress of construction, will not afford the requisite supply of water for the enlarged canal between the lock at Geddes and the Seneca river. The sources from which the remainder of the supply can be obtained, are the Skeneateles and Owasco lakes, either of whieh can be made to supply any deficiencies that may be found to exist. A survey of the outlet of Skeneateles was

made last fall; and it is intended to make such further examinations and surveys as may be necessary to a full understanding of the facilities afforded by both of the above mentioned lakes, for obtaining the remainder of the required supply.

The quantity of water furnished by the Nine Mile creek feeder will be an addition to the quantity now used; and as it will, together with other reliable sources, amply supply the canal when the portion of the line now under contract shall be finished and brought into use, no urgent necessity will exist for making further provision previous to the completion of the enlargement between Geddes and the Seneca river.

On some parts of the enlargement more time will be necessary for an economical execution of the work than would otherwise be required, in consequence of the necessity of doing so large a portion of it during the season of suspended navigation. This circumstance renders the period, during which it can be prosecuted, comparatively short; and a corresponding increase to the force employed with its attendant disadvantages cannot, in some places, be avoided.

The plan that should be adopted, to obtain the requisite depth for the canal across the Cayuga marshes, has not been determined on. That portion between the Seneca river and Mud lock, crossing the Seneca and Clyde rivers, and embracing a distance of one mile and $\frac{4}{80}$, has a depth of about four feet, except in the channel of the latter river, where the depth is much greater. That part of the line extending from Mud lock west five miles, to Pitt lock, (situated on the western border of the marsh) is about six feet deep, and sixty feet wide. A survey has been made with reference to lowering the bottom of the former portion three feet, and raising the surface of the water upon the latter one foot. To obtain the requisite depth for navigation across the Seneca river, without the use of an aqueduct, a cut three feet in depth, below the natural bed of the stream, will be necessary. This cut will lie nearly at right angles with the channel of the river, and will be a receptacle for all the heavier particles of earth borne down by the current. The maintenance of the channel under these circumstances, would always be attended with considerable expense and inconvenience to the navigation, and should the Cayuga marshes ever be reclaimed, by lowering the surface of these rivers at this point, these difficulties would be increased to such an extent as would render a change of plan proper, if not indispensable. It must therefore remain

a question to be determined on further examinations, whether Clyde and Seneca rivers should not be brought together above the canal, and then be crossed by means of an aqueduct, with a wooden trunk resting upon stone abutments and piers, and the location of the Seneca river lock be changed to the west side of these streams. By this means the construction of Mud lock, (with a lift, on the enlarged plan, of $3\frac{8}{100}$ feet) would be dispensed with, and the same number of feet would also be saved in the lift of the Seneca river lock; and should the surface of these rivers hereafter be reduced, an amount of lockage equal to double the amount of that reduction would be saved. More time will be required for prosecuting the work upon any plan that may be adopted for crossing these marshes, than will be necessary for the enlargement of other parts of the canal in this vicinity.

That portion of the Perrinton swamp which is occupied by the canal, is about six miles in length. This swamp is a summit from which the streams entering it from the north, pass off into the Irondequoit and Mud creek valleys, and the drainage of a large portion of the country upon the south, is received into the present canal. In the enlargement those waters must be passed under the canal, which will require the construction of several culverts. The soil is chiefly composed of muck, which must be removed to give place to a more impervious material, which cannot conveniently be obtained. The enlargement through this swamp, will be principally winter work, and comparatively expensive. An allowance of more than the usual time, therefore, for the performance of this work, would materially favor the economy of the execution of it.

To effect the enlargement across the Irondequoit valley, a large amount of work within a very short distance will be necessary. Embankments of such elevation and magnitude, their greatest height being about 71 feet, would be strengthened and materially improved by allowing them time to thoroughly settle, previous to their being brought into use. As the greatest care and circumspection will be necessary in the execution of this work, more time is considered essential, as well to the permanency as to the economy of prosecuting the enlargement across this valley, than would, under ordinary circumstances, be required for an equal amount of work.

The whole of the work which has been put under contract between New-London and Cartersville, as estimated at contract prices, amounts to.....$1,476,556 35
and the payments on these contracts amount to..... 923,438 79

Amount remaining to be done,..... $553,117 56

The expenditures on this part of the enlargement, during the last fiscal year, are as follows:

Amount paid by Jonas Earll, jr.....$146,545 06
do do D. Hudson,..... 228,933 27

$375,478 33

Amount paid by D. Hudson, from September 30th, 1840, to January 1, 1841, $81,198 54.

To provide for payments to contractors, and insure such progress in the execution of this work as is demanded by the present condition of the old canal, the sum of $502,000 will be required for the year 1841, and the months of January and February, 1842; and should the work across the Cayuga marshes, in the Perrinton swamp, and on the Irondequoit embankment, be put under contract during the next season, the additional sum of $75,000 will be wanted within the same period.

The only work which was under contract at the date of the last annual report between Cartersville and Buffalo, was the aqueduct at Rochester; the combined locks at Lockport; section 1, Genesee level, at Lockport; and rock sections 1 to 5 inclusive, in the Mountain ridge, being in the aggregate 2½ miles in length; and several bridges, culverts and waste-weirs. The work put under contract since that period, is a weigh-lock at Rochester; 3 sections in the city of Rochester of about 38 chains each; 10 bridges over the same; and 2 bridges in Lockport. The contract for the ship lock at Black-Rock, has also been executed.

The amount of work contracted previous to 1st January, 1840, at contract prices, is estimated at.....$1,900,272 40
Amount contracted since, is..... 194,025 88

Total under contract,.....$2,094,297 28

The amount paid on contracts up to January 1, 1840, was..... $789,740 15
Amount paid since, ... 391,641 66
$1,181,381 81

Leaving..... $912,915 47

Expenses of engineering up to January 1, 1840, was	$38,423 02	
Expenses of engineering up to January 1, 1841, is	27,723 80	
		$66,146 82
Amount paid for damages awarded by the canal appraisers to January 1, 1840, for lands and buildings in the cities of Rochester, Buffalo, and the village of Lockport, is	$78,392 09	
Paid since that date,	44,377 32	
		$122,769 41

The work on the new aqueduct over the Genesee river has advanced regularly during the season. The parapet walls and coping, are completed for more than half the distance, and a large portion of the remaining parapets are laid. It will be completed the following season.

The construction of the combined locks at Lockport is rapidly progressing. One tier, five in number, is to be constructed on the north side of the present locks before removing the latter. The lower lock is nearly completed; the foundations of two others are laid, and the pits for the remaining two will be excavated this winter. It is expected that this tier will be completed in the spring of 1842. The contracts for the completion expire on the first of April, 1843.

Some inconvenience will necessarily be occasioned after the completion of the first tier, until the second tier shall be constructed, inasmuch as it will be necessary to remove the double flight of old locks to make room for the second tier of the new. As soon as the second tier shall be commenced, the work should be vigorously prosecuted; and it is evidently important to complete the double tier before the increase of trade and consequent increase of lockage at that point, shall add to the difficulties which must necessarily be experienced by passing the boats through one tier only.

The enlargement through the city of Rochester is in good progress. All the new work has been commenced and may be completed before the contracts expire.

During the most pressing season of business this part of the canal is crowded with boats, and their passage is often obstructed. It is due

therefore, as well to the public interests as to the enterprising citizens of Rochester, that the work should be prosecuted with vigor and completed as soon as practicable; so that, not only the facilities for the passage of boats, and flow of water may be increased, but that the streets may be conformed to the new structures, and the interruptions and inconveniences necessarily occasioned by the removal of the old, and erection of the new bridges, remedied.

Considerable difficulty has been experienced for several years in supplying the canal with water from Buffalo to Montezuma, and it has been found necessary, occasionally, to resort to the Genesee river at Rochester for that purpose, and at seasons too, when the water was particularly important to the extensive hydraulic establishments at that city. These difficulties must and will exist until the canal shall be enlarged from Buffalo to Rochester. When that shall be completed with a proper degree of declivity, the supply drawn from Lake Erie will be abundant for the whole distance.

For the purpose of testing the levels between Lockport and Rochester, locating the line, and revising the estimates of the cost of the enlargement, a party was organized in the latter part of October. The levels have been taken, but the surveys and estimates of the cost are not yet completed.

The result of the examination shows that the present canal has a declivity of half an inch to the mile from Lockport to Brockport, but that from the latter place to Rochester, a distance of about 20 miles, the bottom is level, and this circumstance will account in part for the difficulties that have occurred in supplying the canal with water, east of Brockport.

To divert the waters of the Genesee river to any considerable extent, would be manifestly unjust; occasioning irreparable injury to the interests of the citizens of Rochester, and to some extent to the business and revenues of the canal.

As it is intended to feed the enlarged canal from Buffalo to Montezuma exclusively with water drawn from Lake Erie, and as the present supply is barely sufficient, it will be manifest that the division from Buffalo to Rochester should be completed prior to the enlargement of the prism from Rochester to Montezuma.

Serious interruptions to the navigation frequently occur at the intersection of the canal from Buffalo with Black-Rock harbor. In times of severe blows down the lake, it is impossible to pass into or out of the canal; and a delay of a day or more has sometimes occurred, and a damage to boats and cargoes and loss of horses annually occur. It is proposed to change the line in such manner as to protect the canal and remedy the difficulty complained of.

The cutting of the new line for 38 chains will be in solid rock, of which a portion is under water; so that considerable time will be required for the construction of the section.

The completion of the Black-Rock pier on the plan determined upon in 1837, will require time and a considerable outlay of money; but the work has thus far been prosecuted by the superintendent and charged to the general account of repairs. A considerable saving would be effected by using the stone excavated in the section above referred to, in continuing the work on the pier; and it is believed that the interests of the State wonld be promoted by putting them both under contract.

The new weigh-lock at Rochester, as heretofore located, lies within the walls of the new aqueduct. The location is in many respects inconvenient and objectionable. It reduces the channel of the aqueduct at that point to a size barely sufficient for two boats to pass. A narrow basin is connected with the canal at the head of the aqueduct and lock, and being in a central part of the city, forms a point where boats are liable to accumulate; and if the weigh-lock should be placed as proposed, it would materially obstruct as well the passage of boats as the flow of water. A section between the aqueduct and the proposed location of the weigh-lock, should be put under contract the ensuing season.

It is now proposed to change its location to a point about half a mile east of the aqueduct, where the objections to its present location will be avoided, and the water required for its use will be saved to the canal. At the present location the water would be discharged into the river below the aqueduct. The change can be made without materially affecting the cost.

The culvert across the Otter creek embankment is in a precarious condition, and requires to be rebuilt. It sustains a heavy embankment, and the work ought to be commenced without delay. Including this

structure, the guard-lock at Black-Rock and an embankment across Sandy creek, there is no work on the division from Rochester to Buffalo not now under contract which it is important to put under contract without delay, except the excavation through the Mountain ridge, with the guard-lock at Pendleton, and the section and pier at Black-Rock as above stated. The aggregate cost of these several works is estimated at $756,240; to which add the balance of $912,915.47 of the work under contract and yet to be paid for, it makes a total of $1,669,155.47; of which $730,000 will be required in the coming season, and the residue in the years 1842 and 1843.

The following table shows the amount of work under contract for the enlargement of the Erie canal, and the sums paid thereon, and amounts required.

	Estimated cost of work under contract, including that completed.	Amount paid to Jan. 1, 1841, on work under contract, including that completed.	Estimated cost of work remaining to be done on the contracts.	Amount required to 1st March, 1842, for work under contract.
From Albany to Little-Falls,	6,639,325	$4,705,364	$1,933,961	$1,900,000
From Little-Falls to and including Utica,	1,454,817	695,209	759,608	600,000
From Utica to Geddes lock,	589,416	398,691	190,725	181,000
From Geddes lock to Rochester,	1,013,610	537,074	476,536	403,000
From and including Rochester to Buffalo,	2,095,844	1,171,620	924,224	567,000
	$11,793,012	$7,507,958	$4,285,054	$3,651,000
Miscellaneous items, incident to all the work under contract, including land damages, buildings, engineering, &c.	1,024,417	739,337	285,080	207,000
	$12,817,429	$8,247,295	$4,570,134	$3,858,000

CHAMPLAIN CANAL.

After the 1st of March, and before the 20th of April, (when navigation was resumed on this canal,) besides the ordinary repairs of clearing out bottom, repairing locks, waste-weirs, aqueducts &c. the masonry of two locks, and the abutment of two aqueducts were laid up, and nearly five miles of slope wall were laid on the tow-path side of the canal and Wood creek.

For the construction of the "Flynn Lock," (one of those alluded to above) contracts had been made during the season of 1839, with one contractor for the delivery of the stone, and with another for laying up the masonry. The stone had been delivered and most of them cut, on the 20th of March, when the contractors for laying the masonry were to commence, and what remained to be cut at that time, were finished by them, and the lock was completed in time to receive the water on the 20th of April.

The other lock laid up last spring called the "Moses Kill Lock," was constructed by the superintendent of repairs on that division of the canal, by the direction of the former Commissioner. The stone had previously been prepared, and delivered at the site of the lock during the last winter, and the masonry was laid up, and the lock completed so as to pass boats on the 21st of April.

One of the aqueducts, an abutment to which was built last spring, crosses "Fish creek," at Schuylerville, and the other the Moses Kill; both of which were built under the charge of the superintendent; the materials had previously been prepared and delivered by him.

During the season of 1839, a waste-weir near Wilber's basin failed, and no substitute was provided for the discharge of the waters of the Crooked brook, which flows into the canal at the head of Wilber's basin. On the 30th of April last, a violent freshet so much swelled this and several smaller streams which flow into that level, that the other, and the only waste-weir on it, together with what could be drawn off into the level below, through the lock gates, were not sufficient to waste all the water thus discharged into the canal; consequently the banks were overflowed, and a heavy breach produced opposite to the point where the Crooked brook enters the canal, which caused a suspension of navigation from April 30th, to May 7th. The cost of repairing the breach was $741.28.

An examination was made during the summer, with a view of determining the best site and plan of discharging the surplus water from this level, which resulted in adopting the plan of a waste-weir, to be located about 20 chains south of the former one; this location was preferred, because it promised greater economy in the cost of the structure, and less contingencies in its maintenance.

The construction of this waste-weir was deemed to be "*an extraordinary repair or improvement*," inasmuch as it was proposed to build it in a more permanent manner than the former one; and an appropriation of land was necessary. A plan and an estimate of its cost were therefore submitted to the Canal Board, by whom its construction was authorized. Its construction was commenced in September, and was as nearly completed, before the close of navigation, as its location in relation to the towing path would admit. It is now so far advanced as to admit of the passage of water, and will be completed before navigation is resumed next spring.

No other suspension of navigation has occurred on this canal, except that caused by the failure of one of the lock-gates, in the first lock above Waterford, on the 21st of May, which was repaired, and boats passed the next day; and a detention of one day (25th June) in removing bars formed in Wood creek; and one day (8th October) when the water was drawn off the summit level, to remove a boat which had been sunk.

Under the act, chap. 322, laws of 1840, the sum of $1,280.29 has been expended in raising the road on the west bank of Wood creek, in the town of Fort-Ann, as high as the towing path on the creek. This improvement is finished as contemplated by the law, except gravelling the surface of a part of the distance, which it is intended to complete early next season. The estimated cost of finishing this work, as now contemplated, will not exceed the sum of $300 over and above what has already been expended.

The embankment at the south termination of the towing path wall at Whitehall, mentioned in the last annual report of the Commissioners, has not been constructed. The object of this bank is to straighten the line of canal at this point, and to continue the increased width a short distance above that acquired by the construction of the wall. It is to be constructed outside of the present bank, and can be done most advantageously during the suspension of navigation, as the material must

be carried across Wood creek, which can be done at less expense on the ice than at any other season; or it must be carried across the canal during the suspension of navigation.

It is intended to finish this work before navigation is resumed, except so much of it as the material in the old bank will furnish, which is to be taken out, by forming so much of the new bank. During the present winter and spring it will have become sufficiently settled and aggregated to render it safe to remove the old bank during the following winter and spring.

The imperfect manner in which this canal was originally constructed, renders large annual expenditures necessary, or it would soon cease to be navigable; its figure is almost a continued series of curves, rendering the banks liable to wash. For a large portion of the distance, no protection against the wearing away of the banks was provided; and where any has since been made for that purpose, it has, in most cases, been done by a docking of wood, which soon decays, or is thrown out of place by the frosts of winter, and the washing out of the earth from behind it. On some small portions of the line, slope-wall has been laid, but generally of stone entirely too small; and laid on banks improperly prepared, being too nearly vertical for a wall of that description of stone to be maintained more than a season or two without being relaid. From these causes, the perimeter of the cross section of the prism of the canal is very nearly the segment of a circle; so that the full depth of the water cannot be maintained, for more than six or eight feet of its width, in the centre of the canal. In order to maintain a sufficient depth and width of water to admit two boats to pass, it will be necessary to take out large masses of bottom every spring; which will be as constantly replaced by the same or a new quantity, washed in during the succeeding season of navigation.

It has been ascertained that a permanent and durable slope wall, built of suitable sized stone, can be laid on this canal nearly as cheap, at first cost, as a docking of wood; and a system of repairs has been commenced, which it is believed, if continued, will result in improving the navigation, and ultimately lessen the annual expenses for repairs, without materially increasing them, in the mean time, beyond what would be necessary to keep the canal navigable.

There has been procured and deposited on the tow path, of suitable sized stone, enough to lay about five miles of slope wall, which are to be laid before the navigation is resumed next season. The cost of the wall laid last spring and the stone now on hand to be laid next spring, all of which has been paid for, amounts to $8,712.37.

Two locks, one the first lock above Waterford, and the other at Fort Miller, were found to be so defective, that it was thought necessary to rebuild them. They were advertised to be let on the 6th of October last, and contracts were made with efficient and responsible contractors for their construction, to be completed in time to be brought into use in the spring of 1842.

Of the twenty-four lift and guard-locks on this canal, two were rebuilt of substantial masonry in 1834; one in each of the years 1836, 1837 and 1839; and two in 1840; two are under contract to be completed in the spring of 1842. Of the remaining fifteen, one is a guard-lock on Wood creek constructed of wood; new recesses were put into it last spring, and new chambers will be added before navigation is resumed next spring.

Besides those before mentioned, two lift-locks were rebuilt in 1831 or 1832, but of the defective character of the original masonry. Of the fourteen locks, including the two last named, it will be necessary to rebuild as many as two each year, till the whole shall have been rebuilt. If executed in as permanent and substantial a manner as those recently built, the subsequent expense of their maintenance will be materially reduced.

There have been constructed during the last year, two farm bridges, one repairing scow, and one work shop. The latter is located between the second and third lock on the Glen's-Falls feeder, on land belonging to the State. A shop was much needed in that vicinity.

GLEN'S-FALLS FEEDER.

The navigation on this feeder, for a considerable portion of the time in August and September last, was entirely suspended in consequence of its having been necessary to pass through it all the water required to supply the main canal between the dam across the Hudson river at Saratoga and Wood creek at Fort Ann. The Fort Edward dam had become so defective, that it was not practicable, at any reasonable expense, to keep the water in the pond high enough to furnish any por-

tion of the water required to supply the canal, and it became necessary to stop the communication between this feeder and the canal, to prevent the water from the canal, supplied by the Glen's-Falls feeder, passing back through it into the Hudson river.

The sectional area of the Glen's-Falls feeder is not large enough to permit all the water required to feed the summit of the canal to pass through it, and at the same time to maintain a navigable depth, even if it were tight. It appears, however, from actual measurement, that more than half the water admitted at the head of the feeder, leaks out through the fissures in the rocks, over which it passes for about one and a half miles. When the whole supply of water for the canal is drawn through this feeder, its depth at the head of the locks, (which are near the main canal,) does not exceed eighteen inches.

During the last season, while the whole quantity of water required to feed the canal was drawn through this feeder, the only navigation on it, that could be enjoyed, was at short intervals, by stopping the passage of water through the sluices that had been constructed around the locks, thus raising the water in the feeder above the locks a sufficient depth for boats to pass; but while boats were so passed no water was furnished to the canal below, except that supplied by the lockages. The comparatively small amount of timber and marble exported this season from Glen's-Falls and other points on the feeder, have been passed with difficulty into the main canal, and it is apprehended that when that trade shall be in a more flourishing condition, (as there is every reason to hope it soon will be,) its transportation cannot be provided for on the feeder in its present condition; nay more, that in a season of greater draught than that of the last, not only the navigation of the feeder may be suspended, but that also of the main canal between the Saratoga dam and Wood creek at Fort Ann.

To prevent the latter contingency, the main canal may be supplied with water from the feeder at Fort Edward, by constructing a new dam across the Hudson river, just below the present one, or the feeder may be continued up to Baker's Falls, and a dam constructed at that point, and an adequate supply of water obtained from that source. It is believed that both the contingencies alluded to above may be better provided for by enlarging and making permanently tight the Glen's-Falls feeder, by doing which a lasting and copious feeder will be secured,

and at the same time an important, and now necessary navigation will be improved.

When the Champlain canal was constructed it was at first contemplated that Half-Way brook would furnish a supply of water for the summit. That expectation not having been realized, the dam at Fort Edward was constructed; but before it was quite completed a heavy freshet carried away a part of it, and so much deranged the remaining portion as to produce doubts whether a dam could be maintained at that point. As a substitute, a dam at Baker's falls, and a feeder from it was projected, and part or all the work put under contract, but was abandoned by the contractors in consequence of the work proving more difficult than was contemplated. Subsequently, the Glen's-Falls feeder was undertaken, on which wooden locks were constructed, but very little benefit resulted from it, either as a feeder or a navigable communication, until it was improved by the construction of stone locks, &c. under chap. 453 of laws of 1836.

In the mean time, the Fort Edward dam was repaired so as to supply the canal with water until within a few years past, but it is now so much decayed that further repairs would be injudicious.

The law of 1836 authorized the improvement of this feeder, as recommended by the report of Holmes Hutchinson, engineer, submitted to the Legislature with the annual report of the Canal Commissioners. (See Assembly Doc. of 1835, No. 85.) Under this law, twelve substantial stone locks have been constructed, and the prism of the feeder has been enlarged, for a short distance at the village of Glen's-Falls, but nothing has been done to stop the leaks permanently on the rock section, or to do more than to provide very temporary sluices around the locks.

The attention of the Commissioner in charge of the Champlain canal, was early called to the difficulties stated above, and Charles A. Olmsted, engineer on the Champlain canal, was requested to examine and report: *First*, the estimated cost of repairing or rebuilding the Fort Edward dam. *Second*, the cost of continuing the feeder up to Baker's falls, and the construction of a dam at that point, and *third*, the cost of tightening the Glen's-Falls feeder, and of enlarging it, if it shall be deemed necessary.

These examinations have been made and reported by Mr. Olmsted, and his report is herewith submitted, from which it will be seen that he estimates the cost of a

New dam and bulk-head at Fort Edward, ...	$110,884 41
Extension of the Fort Edward feeder to Baker's falls and dam, at that point, ...	62,618 60
To enlarge and tighten the Glen's-Falls feeder, ...	74,204 41

It is because doubts are entertained whether the law of 1836 authorizes the improvement now appearing to be necessary, that the subject is respectfully submitted, for the Legislature to determine which of the plans proposed shall be adopted, if either them.

It has been stated why the enlargement and tightening the Glen's Falls feeder is recommended in preference to either of the other plans proposed, and it is deemed proper also to remark, that it is believed the cost of that improvement will rather fall short of, than exceed, the estimate of Mr. Olmsted. The examination upon which his estimate was based, having been made while the water was in the feeder, precluded his ascertaining to what extent it would be necessary to remove the bottom and substitute lining on the rock section. In order therefore to present the worst features of the case, the estimate assumes that the rock bottom is to be removed for the whole distance, and the surface covered with lining and concrete masonry, and that wooden sides are to be constructed.

It is hoped that a portion, at least, of this expense, may be found unnecessary, for the reason that some parts of the rock will probably be found sufficiently solid, to render it practicable to stop the fissures by tamping them with concrete masonry, at much less expense than to remove the rock from below bottom.

The freshet of February last carried away about 450 feet of the State dam across the Hudson river at Troy, in consequence of which there was no navigation to Lansingburgh until September, when the dam was so far repaired as to admit of the sloop lock being used.

The rebuilding of so much of this dam as had been carried away, was put under contract on the 7th of May, and the injury to what remained, which could not be accurately specified, was repaired under the direction of the superintendent. The amount expended by the superintendent for repairs on this dam, has been $7,728.60; and there

has been paid to the contractors for rebuilding that part of it put under contract, $24,770; and there is a small sum yet to be paid them, the exact amount of which has not been ascertained. The work has been well done, and has resisted the freshets of the fall and winter without having sustained any apparent injury.

OSWEGO CANAL.

The navigation of the Oswego canal was not interrupted during the last season. There are on this canal 18 lift locks, 6 guard locks, 8 dams, 18 road bridges, 2 farm bridges, 12 towing path bridges, 8 culverts and one aqueduct. It is 38 miles in length, and is the channel of navigation between Lake Ontario and the Erie canal at Syracuse. That part of the Oswego river which is used for navigation, has a towing path on its eastern shore, a large portion of which is continually wearing away by the waves of the river during the westerly winds, and can be protected only by a substantial docking. Dam No. 6, which was rebuilt in 1837, was left in an unfinished state, and has been completed last season. Dam No. 2 has been repaired, and an extensive pier constructed for the protection of the west end of it. A substantial stone waste-weir has been erected near Oswego; some portions of the towing path, which had been worn down below high water mark, have been raised and gravelled; the old docking has been repaired, and some additions of new have been made. One lock-house has been purchased, and three new ones erected. Lock No. 15 was greatly injured by the flood of 1837; the end of the dam adjoining the lock was carried away, and the whole volume of the river thrown in the direction of the lock, and passed within a space of 65 feet in breadth, between the lock and the end of the remaining part of the dam, which cut away the embankment and partially undermined the foundation timbers of the lock. The outside of the west wall has settled, and continues gradually sinking, and the location of the injury is such, that it cannot be repaired without taking down and rebuilding the wall. Should it receive no further injury from the frosts of the winter or the floods of the spring, it can be sustained one or two years longer.

Some inconvenience to the navigation has been experienced from bars formed in the Liverpool and Phœnix levels; these will be removed and a new culvert erected, near the village of Phœnix, before the opening of navigation in the spring.

CAYUGA AND SENECA CANAL.

The navigation of the Cayuga and Seneca canal was maintained through the season without interruption. There are on this canal 12 locks, 8 lock-houses, 4 waste-weirs, 14 road bridges, 44 towing path bridges and 6 dams. It is twenty-three miles in length, and connects the navigation of the Seneca and Cayuga lakes with that of the Erie canal at Montezuma ; the locks are all constructed of wood. The lock at the junction of the Cayuga and Seneca branches of this canal was thoroughly repaired last spring, before the opening of navigation ; and the one at the head of the Cayuga branch, was also repaired by removing several courses of decayed timber from the top and replacing them with new, and it was then supposed to be in a condition to last without further expense, until top repairs should again become necessary. But in the latter part of July, the side walls suddenly inclined inwards, and settled at the ends, so as to render the lock unmanageable and entirely useless. On excavating the pit and removing the timbers, it was found that the prostration of the structure was owing to the nature of the material on which it rested, being mostly quick sand, and the defective plan on which it was constructed. The foundation timbers were laid longitudinally with the course of the chamber of the lock, without any sheet piling on the sides, and that at the head was entirely insufficent, extending but little below the bottom of the upper level of the canal ; consequently the water found a passage behind the breast timbers and under the bottom, where the course of the foundation timbers favored the formation of water courses the whole length of the lock. How long this effect had been in progress is not known ; but, on clearing out the pit, it was found that the material had been forced out from under the floor of the lock, to the depth of from eighteen inches to three feet, throughout its entire length. This lock has been substantially rebuilt, in such a manner as to justify the belief that a similar casualty will not again occur. During the time of rebuilding the lock, boats navigating the Cayuga lake entered through the lock at the junction of the two branches of the canal. The towing path bridge across the outlet of the Cayuga lake about 400 feet in length, entirely failed, and a new one has been erected, resting on substantial crib piers filled with stone. The towing path bridge on the upper level, about three hundred feet in length, is worn out and must be rebuilt next season. Two of the dams across the outlet of the Seneca lake must be rebuilt this winter ; one of them is now in progress, and both will be finished before the recurrence of the spring floods.

On the construction of this canal, its entrance into the Seneca lake was left without any protection from the southerly storms, which sometimes occur with considerable violence on this lake, and have occasioned great delays and heavy losses to those engaged in navigating the canals. To obviate these difficulties and prevent the constant accumulation of sand and gravel in the mouth of the canal, a substantial pier has been sunk in front of it two hundred and fifty feet in length, located in such manner as to protect the navigation and remove the necessity of annually dredging the bars from the entrance of the canal.

By the act of the 14th of May, 1840, chapter 302, "the Canal Commissioners are authorized to improve the Cayuga and Seneca canal by cutting a channel through the bar at the northeast bend of the Seneca lake, to the canal, and to regulate the height of the water of the lake and the outlet thereof, in such manner as in their opinion shall be most conducive to the public interests." With a view to the improvement contemplated by this act, the outlet and bar were examined, and a survey thereof subsequently taken, under the direction of one of the chief engineers, who has submitted a plan and an estimate of the cost of the work. This plan proposes the construction of a regulating weir of about 100 feet in length, across the outlet on the margin of the lake, by means of which, an elevation of one foot or fifteen inches, above the ordinary low water of the lake may be maintained until the close of the navigation; and then by drawing the gates of the weir, the surface of the lake may be reduced to the usual low water mark, before the commencement of the annual rise by the spring floods. The season was so far advanced when this plan was matured, that it was deemed too late to put the work under contract with any prospect of its completion in time to be available during the past year.

In the construction of this canal, the bottom surface of the upper level was not laid low enough to give a depth of 4 feet in times of the lowest water in the lake. An excavation of that level to the required depth, would be more expensive than the construction of a regulating wier; but doubts are entertained of the policy of interfering with the natural discharge of the water from the lake. Should any fixture be placed in the outlet for the purpose of controlling the flow of the water, it is believed that claims for damages would be preferred by the mill owners below, for retaining the water, and by the owners of marshes at the head of the lake, for flowing their lands. The question, therefore, not only of economy, but of general policy in the choice of means

for improving this navigation, remains to be settled on a further examination of the subject.

CROOKED LAKE CANAL.

The Crooked Lake canal is in good condition, with the exception of the mechanical structures. The locks are of frame-work, constructed upon the same defective plan as those on the Chemung canal, and have become a source of vexation and expense. The lower lock, which connects the navigation of the canal with that of the Seneca lake, has been sustained to the close of navigation with some difficulty; and on a recent examination, it is found to have been constructed of timber crib-work, to the surface line of low water of the Lake. Above this was erected a superstructure of frame work, which has entirely failed; and the navigation of that canal can not again be opened until this lock shall be rebuilt. The crib-work below appears to have been substantially laid down, and to have remained unchanged to this time; it is intended, therefore, to remove the old frame, and rebuild in the place of it a crib-work of timber, corresponding with that of the lower part of the lock, and to have it completed in the month of April next.

The locks on this canal have been examined since the close of navigation, and, although they are in a bad condition, it is believed that they may all be sustained through another season, excepting the one just described, and that, with considerable expenditures for repairs, they may be sustained two years longer. This canal is eight miles in length, and has 28 locks, 14 road bridges, 5 water weirs, 2 culverts, and 1 feeder; and forms the navigable communication between the Crooked and Seneca lakes.

CHEMUNG CANAL.

There were two interruptions to the navigation of the Chemung canal during the last season, one of which was for a few hours only. The other was occasioned by the breaking down of the gates, and the timbers by which they were supported, at the lower end of one of the locks, and continued two days.

By the first section of the act of April 27th, 1840, chapter 176, "The Canal Commissioners are authorized to rebuild the locks on the Chemung canal and feeder, at such times as may be necessary to maintain the navigation thereof. The said locks shall be made of such dimensions and materials as, in the judgment of the Commissioners, shall be

for the public interest. The said locks shall be made of the like materials and mode of construction as those now in use on the Chenango canal, unless the Commissioners, in their discretion, adopt a less expensive mode of construction."

At an early period in the last season, measures were taken for the survey of the line of this canal, and the location of the sites for the new locks. In the latter part of July the Board of Canal Commissioners, after having examined the route of this canal, held a meeting at the village of Jefferson, at the head of the Seneca lake, for the purpose of determining upon the plan of construction for the locks. At this meeting the engineer who had been directed to take charge of this work, presented his report, accompanied by four different plans, with detailed estimates of the cost of the work on each plan.

The first was for composite locks of the same size as the old ones, to wit: 90 feet long, and 15 feet wide; the estimated cost of which would be $7,263 per lock. The second plan proposes wooden locks of the same dimensions, to be constructed of squared timber in the form of crib work. The estimated cost upon this plan is $4.390 for each lock. The third plan was for composite locks with chambers 18 feet wide by 110 feet in length, corresponding in size with those now in progress on the enlargement of the Erie canal. The cost of a lock of this description is estimated at $11,536.48: and the fourth was for timber locks of the same size, estimated to cost, for each lock, $5,803.78. These estimates do not include any allowance for contingences, engineering and superintendence; being merely comparative, and prepared at the request of the Commissioners, to aid them in determining on the plan upon which these locks should be rebuilt.

In selecting from these several plans, the Commissioners have been guided by what they believed would be the nearest approach to that course which the Legislature intended should be pursued, and which would at the same time best promote the interests of the State. They believed that the construction of the composite locks of the enlarged size, would involve an expenditure not contemplated by the Legislature, when providing for this work, and the advantage to be derived from the difference in the capacity of the locks, could not be enjoyed until the completion of the enlargement of the Erie canal, and the enlargement of the Cayuga and Seneca and Chemung canals also. This plan

was therefore laid aside as not being, in their judgment, the most beneficial to the public interest. The cheaper plan of timber locks of the enlarged size, seemed to be, for similar reasons, equally objectionable. The general opinion now prevailing in that part of the State is, that the increase of business in the transportation of iron, coals, salt and gypsum, will, at some future period, require the enlargement of the Chemung and Seneca and Cayuga canals; and should this expectation be hereafter realized, it would then be seen that a heavy sacrifice would be necessarily involved, in pulling down and rebuilding durable and expensive structures, merely for the purpose of enlarging their capacity.

From these considerations, and the fact that composite locks of the present size would cost, for the whole work, about one hundred and sixty thousand dollars more than those constructed of timber, it was deemed most prudent to adopt the latter plan.

The only material objection urged against this mode of construction is, that it will not afford that degree of firmness and durability which are necessary in structures of this description. But this consideration loses much of its force by the fact, that the plan proposed by the engineer will give to the work a firmness and stability, nearly equal to those of locks constructed of stone. The foundations will endure as long under superstructures of timber as under those of stone; and such parts of the walls as lie below the surface line of the lower level, will be exposed to the action of the atmosphere, only when the water is drawn off for the purpose of making repairs; should care be taken to keep the locks always full, excepting when boats are passing, the timbers, to within two feet of the top, will be continually saturated during the season of navigation. Two or three courses of the upper timbers will decay, and must be replaced with new at periods of nine or ten years. It is therefore believed that locks constructed of timber upon this plan, may, with an inconsiderable expenditure for repairs, be sustained for a very long period.

There are 53 locks on this canal, the rebuilding of fifty-one of which, was put under contract on the 15th of September last; fourteen of them, located at points where the old ones were supposed to be most defective, are to be finished next spring; and from the progress made by the contractors for six more, it is probable that they also will be completed by that time. All the others, except two, are to be in readiness at the opening of navigation in the spring of 1842, and those two

in a year from that time; but should the old locks at the places where these latter two are located, manifest symptoms of approaching failure in the course of the next season, it will be necessary to require them to be completed in the spring of 1842.

Great delay and inconvenience have been experienced in the navigation between the village of Havana and the head of the Seneca lake. Between these points, about three miles of the inlet of the lake is used for the purpose of navigation. At the time of the construction of the canal, the bars in the inlet were excavated to the depth of four feet, in times of low water; but similar bars have been subsequently formed in the channel, extending from the Havana lock about a mile and a half down the inlet, on which, during the last three months of the navigation, there was only about 32 inches of water. A dredging machine was kept in operation, but with little effect, as new bars were formed in other places, or the cuts in the old ones filled in as fast as they could be excavated. These difficulties, which are constantly increasing, have become so formidable as to nearly suspend the navigation during one-half of the season, and to produce a necessity for the construction of a new channel, independently of the inlet, from Havana to the head of the lake. A survey of the route has been taken, and a report thereof, with estimates of the cost of the work, is appended to and transmitted with this report.

There is one section of the Chemung canal feeder, about a mile in length, a part of which was left several inches above bottom when it was constructed, and the depth of the water there was, during the last season, nearly a foot less than in other parts of the feeder. As great injury to the navigation is felt at this point, it is contemplated to reduce the bottom to a proper level, before the next opening of the navigation.

The Chemung canal and feeder are, together, 39 miles in length, and constitute the navigable communication between Seneca lake and the Chemung river, at Corning, in Steuben county, and at Elmira, in the county of Chemung. Among the mechanical structures, there are 8 waste-weirs, 24 road bridges, 3 towing path bridges, 11 farm bridges, and 3 aqueducts; the most of which, in point of durability, are but little superior to the old locks on this canal.

In consequence of the great difficulties and heavy losses of property, which have been experienced in the navigation of the Chemung river,

by rafts of timber and lumber, from the construction of the feeder dam, provision was made for the construction of a chute, for the passage of rafts, at that place. This work was performed in 1839; but from the lateness of the season and an early rise of the river, the lower end of the work was not sufficiently secured against injury by floods; and it was found that the heavy volume of water descending the chute, had excavated a deep pool at the foot of the plane, and raised a heavy bar of gravel and stone, immediately below and in front of it; the consequence of which was, that rafts descending this plane with great velocity, were suddenly plunged into deep water, having comparatively but little motion, and were so crushed and shattered that the value of the fragments was not equal to the expense of collecting them together. The loss to those engaged in the lumber and timber business, on the rivers above this dam, was very serious; and the disasters of that season clearly proved, that this great and staple interest of a widely extended section of the country, would be utterly ruined, unless a remedy could be applied. An attempt has been made to remove this difficulty and danger, by adding a horizontal section to the lower end of the chute, and protecting the channel below from being again washed out, by heavy brush timbers placed on the bottom, with their butts securely fastened to the lower timbers of the chute.

The two sides of the channel below the chute are also protected by heavy embankments of stone and brush. The cost of this work was $1,291.32. The bed of the river, at this place, consists of small stones and loose gravel, which has rendered the construction and maintenance of this dam and its appurtenances, exceedingly difficult and expensive; and, should the improvement now made prove insufficient, there will be much reason to fear that it will not be practicable to sustain the navigation of the Chemung canal, and at the same time protect the timber and lumber trade of the upper branches of the river, without resorting to some plan different from that on which this work was originally constructed.

The act for the relief of Thomas Noyes and others, passed April 28th, 1840, (chap. 192,) authorizes the Canal Commissioners, "if they shall deem the same just and proper, to construct a ditch or drain across the lands of Thomas Noyes, Reuben M. Mundy, John W. Hughson, George Gardner, James Hughson, John Storm, John W. Durham, Jonathan Brown, Jacob Wormley, Matthew Sayre, and John King, suf-

ficient to protect the said lands from inundation or injury by reason of the construction of the Chemung canal feeder."

As this act does not make any provision for the payment of the expense, it has not been thought prudent to commence the work. The leakage from the feeder is occasioned in part by the porous material of which the prism is formed, and partly by the defective manner in which the work was executed. It occurs chiefly in a distance of about two miles, extending along the rear of the intervale, commonly called the Big-flats, and in a distance of about half a mile, immediately above the upper lock, at Fairport; and the escape of the water from the feeder at these places, cannot be prevented without lining the bottom and sides with a more compact and adhesive substance. These lands have been thoroughly examined, and a survey taken of the line of ditches which will be required to carry off the water, and prevent its retention in ponds on the lands; and an estimate has been made of the cost of the work, amounting to $2,856.48. This estimate so greatly exceeds the sum which, at the time of the passage of the act, was supposed to be sufficient, that it remains a question whether it will not be better economy to attempt to suppress the leakage by lining the canal feeder. No examination has been made with a view of determining the practicability and success of the latter plan, or of ascertaining the cost of its execution. It is therefore suggested that, in providing for the expense of any work which may be undertaken to prevent the continuance of the injuries complained of, it is desirable that a legislative direction be given, as to the plan to be adopted, or that the Commissioners be authorized to select such as shall appear, upon further examination of the matter, to be the most useful improvement.

The Chemung canal approaches more nearly to the navigable communications now in progress of construction by the State of Pennsylvania, than any other of our State canals, and the valley in which it lies presents the lowest summit found in the range of elevated grounds which divide the waters flowing to Lake Ontario, from those which descend the valley of the Susquehanna. The repairs and improvements of this canal are therefore of great importance, as affording the shortest, cheapest and most feasible route through which the internal commerce between Central Pennsylvania and Western New-York can be carried on. The trade in coal, iron and lumber, from the former, and salt, gypsum and lime from the latter, has been recently much in-

creased, and will be greatly augmented by the completion of the facilities now in progress for its accommodation.

The inexhaustible coal mines at Blossburgh are now connected with the head of navigation of the west branch of this canal, by a substantial rail-road which has just been completed and put in operation, and it may be reasonably expected that they will soon furnish trade sufficient to justify expenditures to the extent of any estimate heretofore made, for placing this canal in the most secure and ample condition.

In rebuilding the locks on this canal, some portions of the material of the old ones may be used, and hopes are entertained that the foundations of several of them may be found sufficient, with proper repairs, to rebuild on, whereby a small part of the expense of reconstruction will be saved. The whole cost of rebuilding, in case all the old foundations shall prove to be defective, is estimated at $264,000. The work has been recently commenced, and $6,913.16 has been paid on account of it, since the close of the last fiscal year. The appropriation of $100,000, made at the last session of the Legislature, will be exhausted before the commencement of the next session, and, in order to insure the prosecution of this work as steadily and rapidly as will be required to continue this canal in a navigable condition, an appropriation, equal to the balance of the estimated cost of the whole work, will be necessary at the present session.

INLET OF CAYUGA LAKE.

The obstructions to the navigation of the inlet of Cayuga lake have been removed, under the provisions of the act of May 14th, 1840, chap. 316, the cost of which was $300, and that navigation, which had been subjected to much inconvenience, has been relieved and will be in good condition at the commencement of the next season.

The following is a statement of payments made by D. Hudson, on account of the State canals, from the 22d February, 1840, to January 1, 1841:

On account of the enlargement of the Erie canal,		$307,166 81
do	improvement of the Oneida river,	20,320 25
do	Chemung canal locks,	6,913 16
do	do do (damages,)	175 00
do	Crooked-Lake canal,	2 00
do	Erie and Champlain canals,	151 75
		$334,668 97

Under special Acts.

Act of April 26, 1839, to extend and improve the chute in the Chemung canal feeder dam,	$1,291 32	
Act of May 14, 1840, to remove obstructions from the inlet of the Cayuga lake,	300 00	
Act of April 10, 1839, to appraise damages of Cotton and others, Erie and Champlain canals,	3,025 00	
		$4,616 32

Under Resolution of the Canal Board, passed June 26, 1840.

To erect a pier at the head of the upper level of the Cayuga and Seneca canal,		2,006 50
		$341,291 79

Payments by J. Earll, jr. from Jan. 1, *to Feb.* 22, 1840.

On account of the enlargement of the Erie Canal,	$20,319 64	
On account of improvement of the Oneida river,	1,864 00	
		$22,183 64
		$363,475 43

IMPROVEMENT OF THE ONEIDA RIVER.

The act authorizing the improvement of the Oneida river, was passed April 29, 1839, and the work was placed under contract in October, of the same year. The plan adopted by which the object of the act is to be carried into effect, consists of thorough cuts through the principal bars and rapids, and in the construction of two lift-locks of ordinary hammered masonry, one brush dam with stone abutments, and the requisite embankments and towing paths above and below the locks.

The act directs the improvement of the river for the navigation of steam-boats, and prohibits the adoption of any plan that in the opinion of the Canal Commissioners, would require the expenditure of more than $75,000. With an appropriation so limited, a navigation for steam-boats of the smaller class only, could be provided for.

In the plan adopted for this improvement, there is given to the cuts a bottom width varying from thirty to eighty feet; and to the chamber of the locks a width of thirty feet by one hundred and twenty in length, and a depth of four and a half feet of water in all places, during the lowest stages of the river.

This work is divided into four sections, as follows: The first commences in deep water at the outlet of Oneida lake, and terminates at the head of the rapid at Caughanoy; the second extends to the head of Oak Orchard rapid; the third embraces the rapid at Oak Orchard; and the fourth extends from the foot of said rapid, to the Oswego river and canal, at Three-River point. The first section has a length of four miles and four chains, and a fall in the surface of the river of one foot and $\frac{46}{100}$. The second is six miles and six chains in length, and has a fall as above, of $3\frac{20}{100}$ feet. The third has a length of seventy-eight chains, with a fall of $2\frac{82}{100}$ feet; and the fourth has a length of seven miles and seventy-six chains, and a fall of one foot and $\frac{6}{100}$; making the length of this improvement nineteen miles and four chains, and the whole fall, in the river, $9\frac{14}{100}$ feet.

One foot and $4\frac{2}{100}$ of the fall in the first section, occurs at the Fort Brewerton reefs, which are formed by two bars. The first is situated directly at the outlet of the lake, and has a length of twenty-two chains. The second, situated below the first, has a length of $5\frac{65}{100}$ chains. The fall at this reef is to be sufficiently reduced for an easy ascending navigation into the lake, by means of a cut through the bars along the northerly shore of the river, having an average width, including the slopes, of 95 feet at the point of deepest cutting.

A descent on section No. 2 of $3\frac{69}{100}$ feet, occurs at Caughanoy rapid. A lock placed at the foot of this rapid, and a cut of thirty feet wide on the bottom, extending from the lock thirty-six chains to deep water at the head of the rapid, with an embankment on its outer side raised above high water mark, is to constitute the principal improvement at this place. The fall on section No. 3 is to be overcome by means of a lock and dam, placed near the lower end of the section. The dam is designed to give the water in the pond the same elevation as that of the surface of the river above the rapid; and to obtain the requisite depth for navigation, a cut 55 feet wide on the bottom through the rapid, is to be made. The work on section No. 4 consists principally in the excavation of a channel through five bars, having an aggregate length

of 63 chains, and raising and otherwise adapting to the navigation, a road bridge which crosses the river on this section.

During the past summer the work has progressed upon the three lower sections, and upon the two locks and the dam. Several causes have operated to prevent the execution of as large a portion of the work upon this improvement during the past year, as was directed.

In consequence of high water, which continued on the river to an unusually late period, the under-water excavation could not, with due regard to economy, be commenced until the latter part of June. Subsequently the plan upon which the excavation of a part of the cuts had been undertaken, was in some instances abandoned, and in others the machinery proved defective, not serving fully the purpose for which it was designed. Considerable time was therefore consumed in preparing and bringing into use other and more efficient means for performing the work. Under-water excavation, operated by horse power stationed upon floats made fast to the shore, constitute the principal means thus far employed in forming the cuts. As this, under the most favorable circumstances, is a slow process, an increase in the number of machines, or a resort to other modes of executing the work, will be necessary to a more rapid advancement. In some cases, however, the open and porous character of the material to be excavated, compels the necessity of pursuing this plan; and in others, the small amount of excavation required, in consequence of the water having nearly the requisite depth, renders it the most economical. Hopes are entertained that some of the deeper portions of the cuts may be enclosed by coffer-dams, and the excavation performed in the ordinary mode. By this means a large force can be advantageously employed, and a much more rapid progress given to the work.

The character of the material remaining to be excavated can not, in the present stage of the work, be correctly determined. Its situation under water, precludes the possibility of such an examination as is necessary for this purpose. Cemented sand and gravel have been found embedded in a fine, compact sand, mixed, in some instances, with gravel and small boulders of stone. Thin strata of this substance have occurred, covering an area of several rods, resting in some instances upon a substance resembling quicksand, and in others the material is loose gravel; some quicksand has also been found.

The contracts contain prices for the excavation of the usual varieties of material, but the peculiar circumstances of position, and the manner in which the excavation is in some cases to be performed, very much enhances the difficulties of a proper classification. That these substances will continue to be found in prosecuting the remainder of the excavation, is more than probable, but the precise quantity cannot, as before stated, be ascertained until after the work shall have been further advanced. From the developments thus far made, it is not expected that materials of the more expensive kinds will occur in larger quantities than is provided for in the annexed estimate.

The lock at Oak Orchard is completed. The dam abutments, and about one-fourth of the body of the dam are also done. The cut through the bar upon which the lock is located is nearly completed, and a part of the pit for the lock at Caughanoy is excavated. All the face stones for this lock are dressed, and a large portion of the backing is quarried, and in progress of delivery at the site of the lock.

The following statement shows an estimate of the cost, as nearly as can now be made, of the whole improvement at the contract prices; the amount of work done under each contract, and the amount remaining to be done:

STATEMENT.

CONTRACTS.	Dist. in miles and chains.	Per ct. of amount done.	Fall in feet.	Estimated total cost.	Amount done.	Estimated amount remaining to be done.
Section No. 1,	4.04	0.00	1.46	$8,164 00	.....	$8,164 00
do No. 2,	6.06	0.10	3.80	9,600 00	975 00	8,625 00
do No. 3,	0.78	0.24	2.82	4,535 06	1,080 00	3,455 00
do No. 4,	7.76	0.02	1.06	8,605 00	200 00	8,405 00
Lock and dam also cut through bar No. 6, at Oak Orchard,	.....	0.83	.....	20,940 90	17,458 50	3,482 40
Lock at Caughanoy,	.....	0.18	.....	14,164 20	2,588 00	11,576 20
Valve gates,	.....	.....	.....	750 00	.....	750 00
	19.4	0.33	9.14	$66,759 10	$22,301 50	$44,457 60
Not under contract.						
Monuments indicating channels, raising river bridge at Oak Orchard, and other miscellaneous expenditures,				8,149 84	2,321 72	5,828 12
Total,				$74,908 94	$24,623 22	$50,285 72

The following payments were made on this work during the last fiscal year:

By Jonas Earll, jr.	$4,269 44	
By David Hudson,	11,859 50	
		$16,128 94

Amount paid D. Hudson, from Sept. 30th, 1840, to Jan. 1st, 1841, $8,460.75.

Under the act of April 18th, 1838, a towing path was constructed on the bank of the Seneca river, from Mud Lock on the Oswego canal, to Baldwinsville, a distance of 5 miles and 28.52 chains. By this act the Canal Commissioners were required to establish such rates of toll on all boats and property passing on this part of the river, as will produce an income of five per cent on the cost of the work. By the last annual report of the Commissioners, it appears that the towing path was completed in October, 1839, at the cost of $14,864.26, and that the collectors of canal tolls at Salina and Syracuse, had been directed to collect the same rate of tolls, on this navigation, as had been established on that of the Erie canal. The results of one season were necessary to constitute a basis on which to determine what rate of tolls would produce the amount of income required by the act. The proper rates will be established for the next season.

CHENANGO CANAL.

The navigation upon the Chenango canal has been maintained in a good condition and with few and unimportant interruptions during the past season. Very few breaches have occurred, and none to materially affect the navigation.

The banks of the canal have generally become quite firm and substantial, and give promise of future permanence and safety.

This canal was very faithfully constructed, and not only the work pertaining to the prism, but all the mechanical structures, stand exceedingly well; and, from all appearances, no important expenditures will be requisite to maintain them in good condition for several years to come.

The reservoirs, designed chiefly to furnish an adequate supply of water for the summit, and northern division of the line, have continued to answer the object intended. They appear to continue in good order, and are maintained at a small expense. The supply of water afforded having been somewhat greater than the business on the canal required, during the past year, a small addition has been contributed in aid of the Erie canal from this source.

The expenditures for salaries of superintendents, lock tenders, wages, and keeping the canal in repair, have amounted to $14,775.24, which is less by $2.215.40, than for the year 1839.

BLACK RIVER CANAL.

The work on this canal has proceeded steadily, and as much work has been done as the amount appropriated to this object would justify.

The section work on the first division of fourteen miles, extending from Rome, through the fertile valley of the Mohawk river, to the mouth of the Lansing Kill, is nearly finished. There are twenty-five locks on this division: of these nineteen are under contract, and in a great state of forwardness: six were abandoned by the contractors, and have not yet been re-let.

The aqueduct across the Mohawk river, and that across the Wells' brook, have been commenced; and the abutments and piers have been raised above low water mark. The aqueduct across Stringer's creek is nearly complete; that across the Lansing Kill is but just commenced.

A few only of the bridges have been built. A due regard to economy seemed to forbid an expenditure for bridges, until near the time when the canal would come into use; the road-ways, therefore, have, in most cases been left; the bridges can easily be built by the time they are wanted. In this way, the loss attendant on their decay, as well as the loss of interest upon cost, is saved to the State.

The culverts and waste-weirs on these fourteen miles have been let, and some of them are completed.

This part of the canal could be made navigable by July, 1842, at a further expense of $251,006.88.

From the mouth of the Lansing Kill, in Western, to the north end of the summit, in Boonville, is about eleven miles. The section work on this division is in a forward state. The rock excavation at the summit will probably be completed during the next season. On these eleven miles are located forty-five locks: of this number thirty-one are under contract, and the work upon them is about two-thirds done; eight have been abandoned by the contractors, and have not yet been re-let; and six have not yet been put under contract. Some work has been done on the eight abandoned locks.

Materials have been delivered for several of the culverts. One bridge, where the turnpike crosses the canal, in Boonville, has been built; and materials have been delivered for several others.

To complete this division of the canal will require an expenditure of $393,362.18.

From the north end of the summit to the High falls on the Black river, is about ten miles. All the section work on this division, except about two or three miles, has been put under contract. Section No. 25, however, was abandoned by the contractors, nothing having been done by them upon the work. The aqueduct across Sugar river, which was located on section No. 25, has not been put under contract. One road bridge has been built on this division of the canal; and materials have been delivered for several others.

The stone quarries upon, and adjacent to, this part of the line, are not probably surpassed by any in the State. The lock contractors have, in consequence, been enabled to proceed rapidly with their work. Several of the locks on this division are nearly finished.

Two or three miles at the northern termination of the canal, have not yet been located by the Commissioners. The small amount appropriated by the last Legislature, forbade the idea of putting this part of the canal under contract; and there were questions connected with the termination, of much importance, yet remaining undecided. They are particularly stated in the last annual report of the Canal Commissioners; vide Assembly Documents of 1840, No. 60, page 29.

The work on the feeder has progressed steadily, and should the requisite funds be provided by the Legislature, this work, with the dam and guard-lock not yet under contract, may be completed early in the summer of 1842.

It was thought advisable not to put more work under contract the past season for the following reasons: It was found, on an examination, that the work under contract last spring, exceeded in amount one and a half millions of dollars. The amount appropriated by the last Legislature, with the unexpended balance of the year before, was not large enough to pay the contractors for the work they might reasonably be expected to perform before another appropriation could be realized. Under these circumstances it seemed due to the contractors, and to good faith, that the money applicable to this work should be faithfully applied in discharge of existing obligations.

For the same reasons, the Commissioners have refrained from doing any thing to improve the navigation of the Black river.

By the table hereunto appended it will appear that, of the total amount of $2,287,374.80, estimated as the cost of this canal, exclusive of the river improvement, the portion under contract amounts to $1,680,079.73 of which work has been done and paid for up to the 1st of January, to the amount of $1,197,348.65.

It will be perceived that in the above amount, is included $290,-097.66 for the cost of the feeder from the Black river, which is intended, not only to supply the Black River canal, but to furnish the principal supply of water for the long level of the Erie canal, between Utica and Syracuse; and from thence to the Little-Falls. The speedy completion of this feeder is a matter of indispensable necessity to the successful maintenance of the navigation upon the Erie canal; care has therefore been taken to place this portion of the work beyond the reach of casualty.

The amount already expended on the feeder, is	$142,533 59
Leaving yet to be expended the sum of	147,564 07

The amount expended by William Baker, Esq. during the last fiscal year, ...	$208,194 32
The amount expended by S. Newton Dexter, up to the close of the fiscal year, ...	329,600 42
Amount expended by S. N. Dexter, from the close of the fiscal year to January 1, 1841, ...	104,047 70
Amount required to pay contractors on the Black River canal, during the present year, ...	450,000 00
Amount required to pay for work on the canal and feeder, to be put under contract the present year, ...	300,000 00
	$750,000 00

A TABULAR VIEW

Of the estimates on the first, second and third divisions of the Black River Canal, including the expense of the Black river and Erie canal feeder.

DIVISIONS.	Am't of work under contract.	Am't of work not under contract.	Total amount of work.	Total amount of payments on work.	Am't required to finish work under contract	Am't requi'd to finish work not under contract	Total am't required to finish work.
1st Division, from the Erie canal at Rome to the Lansing Kill aqueduct, 14 miles,	$483,861 88	105,254 00	$559,115 88	$308,109 00	$145,752 88	$105,254 00	$251,006 88
2d Division, from the Lansing Kill aqueduct to the north end of the summit level at Boonville, 11 miles,	643,622 18	195,644 50	839,266 68	448,904 50	197,717 68	195,644 50	393,362 18
3d Division, from the north end of the summit level to the northern termination of the canal, 10 miles,	382,188 82	216,705 76	598,894 58	300,801 56	81,387 26	216,705 76	298,093 02
4th Division—Black river and Erie canal feeder, from the north end of the summit level at Boonville to Williamsville, on the Black river, 10 miles,	200,406 85	89,690 81	290,097 66	142,533 59	57,873 26	89,690 81	147,564 07
	$1,630,079 73	$607,295 07	$2,287,374 80	$1,197,348 65	$482,731 08	$607,295 07	$1,090,026 15

To this amount must be added land damages, the amount of which cannot be ascertained until decided by the appraisers.

GENESEE VALLEY CANAL.

That portion of the Genesee Valley canal, from its intersection with the Erie canal at Rochester, and the Genesee river dam, near Mount Morris, a distance of 36 miles, was so far completed, that the water was let in, the latter part of August, and the navigation was opened on the first day of September last.

The difficulties and delays usually encountered in filling a canal constructed through a coarse gravelly soil, occurred on the levels above Scottsville; although, in consequence of leaks, some time elapsed before a full height was obtained on all the levels, a sufficient depth of water was acquired for the transit of boats.

As the banks gradually became tighter, the leakage so far diminished that the levels were all filled and maintained without difficulty.

A breach occurred in the embankment at Black creek, adjoining the culvert, on the 6th of September, carrying out about 15,000 cubic yards of earth, which occasioned an interruption to the navigation on the levels from Scottsville to Rochester, of about eight days. The navigation was also interrupted a few hours in consequence of leaks which occurred at culverts on sections 6 and 34; with these exceptions, the navigation was uninterrupted until the second day of December, when it was finally closed by the inclemency of the season.

On the first day of September, the first packet-boat passed from Rochester to Mount Morris, crossing the river above the dam, thence by a mill canal to the village, a distance of about one mile. A daily line of packets has been running from Rochester to the Genesee river dam, since that time; numerous ware houses have been erected along the line of the canal, and freight-boats have been engaged in the transportation of produce and merchandise. A collector's office has been established at Scottsville. The amount of tolls received on the canal is $6,929.15. A table is annexed, exhibiting the quantity and kind of property transported on the canal, and the amount of tolls received. There have been 915 lockages at lock No. 1.

Serious and embarrassing obstacles have been encountered in the construction of some portions of this part of the canal. The whole valley of the Genesee, and the hills bordering it, are underlaid or intermixed with veins of quicksand. At points where the canal approaches the river, the difficulties of construction are increased; these are more

especially encountered on sections 24, 25, 26, 27, 28, and 32; in some cases the banks have settled, and in others, slides have occurred, but not to such an extent as to interfere with the navigation; these banks have been raised where required; reduced in width at the top, in some cases, to lessen the pressure; and increased and strengthened at the base, by the addition of brush and earth, for the purpose of sustaining the banks, and guarding against the action of the river.

On sections 24 and 28, the greatest obstacles were encountered. The measures taken to sustain the banks, are not yet perfected, and it may become necessary to move the canal for a short distance on the latter section, about half its width into the hill, and incur further expenditures to secure the other.

It was found necessary also to extend the culvert at Fowlerville creek, on section 25, and give additional support to the wings and increase the base and slope of the embankment.

Ditches to a considerable extent have been necessary, for the purpose of draining portions of the land lying below the canal which were flowed by leakage; a portion have been constructed, and others are constructing; the leaks were diminishing when the navigation closed, and it is believed, as the banks will become more compact, that the ditches already constructed, and in contemplation, will secure the lands from further injury on that account.

On this portion of the canal, there are 8 stone lift-locks and 2 guard-locks, 11 double track road bridges, 17 single track road bridges, 3 towing path bridges, 40 farm bridges, 46 culverts, 10 waste-weirs, 2 aqueducts, 2 dams, and 1 bulk-head.

Six lock-houses have been put under contract, one of which is completed, and the others are in progress. Four small buildings have been erected at the other locks for temporary lock-houses and preservation of tools.

Several of the contracts were open when the navigation commenced, and all are not yet closed. From the causes above stated, the cost of the division will be somewhat increased beyond the estimate heretofore submitted.

This division of the canal is supplied with water from the Genesee river to Scottsville, 24 miles; from thence to the Erie canal, by Allen's creek, 12 miles.

From the dam to the intersection of the Dansville branch, a distance of $5\frac{22}{100}$ miles, there are 2 locks; from thence to Dansville, the distance is $11\frac{12}{100}$ miles, on which there are 8 locks. There are also on this portion of the main line and the branch canal, the following structures, namely: 12 road bridges, 21 farm bridges, 1 towing path bridge, 12 culverts, 6 aqueducts, 4 waste-weirs, 2 dams and bulk-heads, and 3 lock houses.

The section work, bridges, culverts, aqueducts, waste-weirs, and dams, are in an advanced state. The locks are not as far advanced, especially Nos. 9 and 10, near the Genesee river. The foundations of these are laid, the materials, in part, delivered, and it is believed the whole may be completed in the month of August next.

A contract has been entered into in connection with the Squakie-Hill Bridge Company, for the construction of a towing path bridge over the Genesee river, attached to the road bridge; which, with the extension and docking along the bank of the river, to the guard-lock, will be completed the ensuing spring.

The supply of water is obtained from the Canescraga creek, received into the canal at Woodville, and Mill creek, at Dansville.

It is desirable that this portion of the canal should be pressed to its completion at as early a day as practicable, that the benefits resulting from a part of the season of navigation, may be derived.

From the junction with the Dansville branch, at the Shaker settlement, to Portageville, a distance of about 17 miles, the most difficult and expensive portions of the canal are encountered. The deep cutting on section 54, the tunnel and slide banks on section 57, the heavy rock excavation and slides on 58, and the aqueduct over the Genesee river, are all included in this division. There are also 50 composite locks, 3 aqueducts, 7 waste-weirs, 6 culverts, 30 road and farm bridges, and one lattice-work bridge, at the deep cut, of 150 feet in length.

Nearly all the work has been commenced, and more than one-third is done. The section work is about half done. On the smaller aqueducts and culverts, waste-weirs and bridges, little more has been done than preparing and delivering materials.

The locks are all commenced, and the masonry, in a portion of them, nearly completed.

The Canal Commissioners, in their annual report submitted to the Legislature on the 28th January last, in speaking of this division of the canal, remark, "that casualties may, and probably will, occur, in overcoming obstacles like those which are encountered on this subdivision, must reasonably be anticipated; and particularly in the deep cut through the dividing ridge, where quicksand already displays itself in considerable quantities; and an increased amount of arching in the tunnel may also increase somewhat the eventual expense of that structure;" and the chief engineer, in a report dated 22d January, 1840, submitted to the Legislature on the 6th February, by the Acting Commissioner, remarks, in relation to the deep cut on section 54, "that the large amount of excavation yet to be done, and the treacherous character of the materials thus far indicated, have induced the belief that this cut will prove one of the most serious obstacles to be encountered on the line of the canal." The experience of the past year, as the work advanced, has fully justified these expectations. Although allowances were heretofore made for unforeseen difficulties, yet no certain reliance can be placed on an estimate of the cost of the section, until the character and extent of the materials of which the hill is composed are more fully developed. The increased quantity of quicksand already encountered, warrants the conclusion that the cost will considerably exceed the amount of the last year's estimate.

Increased quantities of quicksand and cemented materials have been encountered on sections 55 and 56. On that portion of them already completed the cost has been increased; that portion remaining to be done is of a similar character, and the cost may be increased in a greater ratio, as these materials have been encountered at places not indicated by the test pits.

An extensive land-slide occurred in the month of April last, near the southwest end of the tunnel, on section 57. For a distance of about six chains the embankment for the canal moved off bodily, carrying along the sliding material underneath it, from three to ten feet in depth.

The formation under the sliding material is clay, impervious to water and although the cost of the section is considerably increased from the original estimate, by reason of the slide, yet the result has shown that a large portion must have been removed before a permanent foundation could have been secured.

The clay upon the face of the hill beneath the slides, has been cut into horizontal steps, on which the banks of the canal are constructed. To guard against future slides, and give stability to the canal banks, the water on the side hill above has been collected by drains and ditches, and is to be carried under the canal by means of a culvert; the banks are formed of good materials and the bed of the canal is to be lined and puddled.

Whether the difficulties are overcome and a permanent foundation secured, (owing to the position of the line and formation of the hill,) it is impossible to determine. Increased difficulties may arise by reason of slides from the inclination above the canal, and other causes not foreseen.

The excavation in the tunnel has proceeded steadily during the season. In the progress of the excavation, earth has been encountered a part of the distance where rock was supposed to exist. The strata in the rock excavation forming the roof have frequent vertical and horizontal seams, to such an extent as to render arching for most, if not all the distance, necessary. A portion of it might be sustained by timbers, but in a work of this character doubts are entertained whether the difference in the cost will justify the experiment.

The heading of the tunnel has been extended through the rock, amounting to 760 feet in length, and also 100 feet into the earth, and for the distance of about 600 feet it is excavated its required width to bottom of canal. The quantity of excavation done in the tunnel during the past year is about 12,000 cubic yards. The excavation of the gallery is nearly completed, and intersects the main line about 800 feet from the northern entrance.

Changes have been made which will reduce the cost in some particulars, but the increased amount of arching will materially increase the entire cost.

No material change has occurred in the character of the work on section 58. A portion of it is heavy rock excavation, expensive but not difficult of construction. Similar obstacles are encountered on a part of it as on the adjoining section 57, to what extent is uncertain.

The construction of the Portage aqueduct is in progress and about one-third of the work is done.

The foundations of the abutments and three of the piers are completed, and one other pier foundation nearly so. The masonry in one of the abutments has been carried up to the height of $11\frac{1}{2}$ feet, and of the piers from $2\frac{1}{2}$ to 10 feet. The stone for finishing the structure are principally quarried and about one-half dressed. The walls of the abutments and piers have been diminished in size so as to reduce the cost of the aqueduct about $27,000.

From Portageville to the Genesee river feeder on section 77 in the town of Caneadea, the distance is $19\frac{23}{100}$ miles.

This division is subdivided into nineteen sections, on which there are 11 composite lift-locks and one guard-lock; 51 farm and road bridges; 2 lattice-work bridges over river channels; 19 culverts, 4 aqueducts and 3 waste-weirs.

All the work under contract, except the bridges on section 64, has been commenced. The section work is more than half performed, and the locks and other mechanical structures more than one-third.

The timber foundations for all the locks, except No. 65, are completed; the masonry of 4 of the locks is nearly completed, and the walls are commenced at 7 of the others.

West Coy and Cold creek aqueducts have been commenced. The materials are preparing and in a course of delivery. The foundation of the latter structure is finished, and about 300 yards of masonry laid.

Caneadea creek aqueduct is more than one-third done. The foundation is in, and the masonry considerably advanced.

Two new channels for the Genesee river opposite sections 68 and 71 were necessary, to avoid constructing the canal on the slope of the hill where heavy land-slides occur. The construction of a bridge over each of these channels was required for the accommodation of the farms through which they passed. That over the channel opposite section 71 is completed, and materials are in preparation and delivery for the one opposite section 68.

The location of the Genesee river feeder has been changed and is to enter the canal on section 77, instead of section 78, as before located. Its length is reduced, and its exposure to the abrasion of the river diminished by the change.

From the Genesee river feeder to Olean, $29\frac{90}{100}$ miles, lockage 338 feet.

The work under contract on this portion of the canal embraces 24 miles of canal, and the Ischua feeder; also 32 composite locks, 1 double and 14 single track bridges and 19 farm bridges, 1 wooden trunk aqueduct, 27 culverts and 6 waste-weirs.

That remaining to be put under contract, includes sections 90, 93, 94, 96, 97, 98 and 107; locks 103, 104 and 105; the bridges on sections 78, 79, 83, 89, 92, 99, 100, 106 and 107; the culverts on sections 79, 88, 92, 94, 95, 96 and 97; valve gates for locks, lock-houses, and Oil creek and Ischua creek reservoirs. The estimated cost of these items is $514,202.31.

But one section (104) has been put under contract on this portion of the canal during the past year, and the contractors for sections 80, 102, 103 and 104, have agreed to construct the culverts which occur on those sections under their section contracts.

The estimated cost of these items, including contingences, was	$10,829 90
Their cost at contract prices, amounts to	9,013 10
Difference,	$1,816 80

At the letting held at Cuba on the 9th day of October, 1839, the culverts on sections 79 and 80, were allotted to David H. Richardson; and the bridges on sections 78, 79, 99 and 100, to Robert Ferguson & Co. The contracts for this work, as stated by the engineer, were in the hands of those contractors, and were supposed to have been executed at the date of the last annual report, in which these items were included in the work under contract. These contracts have not yet been executed, and the work is now embraced in that specified above as not under contract.

The bridges were estimated at	$5,499 74
And the culverts at	2,820 33
Total,	$8,320 07

The timber foundations for ten locks are completed. The foundation of the Olean creek aqueduct is also completed, and the masonry commenced.

This division of the canal from the Genesee river feeder to Olean, a distance of $29\frac{900}{1000}$ miles, must be supplied with water mainly from artificial reservoirs. Of these, that at Rockville only has been commenced, the estimated cost of which is $9,409 29. It is now nearly completed, the work having been performed under the contract for constructing sections 82 and 83.

In regard to the Ischua feeder, the plan is not definitely settled. Two methods are proposed: one for forming a large reservoir, by the construction of an extensive dam across the Ischua creek, about three miles distant from the canal, as detailed in the report submitted to the Legislature on the 6th of February last, before referred to; the other proposes to reduce the dam and capacity of the Ischua reservoir, and converting three small lakes, distant some thirty miles, into reservoirs, by the construction of smaller dams, and supplying the Ischua at pleasure.

An examination has been made the past year by William H. Talcott, resident engineer, with reference to the cost of construction, capacity, dimension and supply of water, on this plan; and a detailed report by the chief engineer, accompanied by a tabular statement, is hereto annexed.

It will be seen that the supply of water by means of the lakes is less, and the cost of construction is somewhat greater, than that of the large reservoir on the Ischua. It is believed, however, that the supply will be equal to the demand in either case; and the variation in the cost of construction is so small, that it ought not to have great weight in determining upon the plan.

On either plan it is an important question, involving the expenditure of a large amount, and the permanent supply of about thirty miles of canal with water. The location has been delayed for the purpose of obtaining all the information necessary to a correct decision.

The cost of the Ischua creek reservoir, on the plan of introducing the lakes, is estimated at $77,000

Beaver lake reservoir, ...	10,300
Mud lake do	103,600
Fish lake do	27,200
Feeders, ...	21,600
	$239,700

The cost of the Ischua creek feeder on the large plan, excluding the lakes, is estimated at 231,614

Making a difference in favor of the latter plan, of.. 8,086

The appropriations being limited to an amount barely sufficient to carry on the work already under contract advantageously, the remaining reservoirs have not been contracted. Their estimated cost is $346,830.97. To insure their completion by the time the other most difficult and expensive portions of the canal can be completed, they should be placed under contract early the ensuing spring.

The new work put under contract the past year amounts, at contract prices, to the sum of $17,318.60.

Notwithstanding there is an increase in the estimated cost of the most difficult portions of the canal, there is considerable diminution in others. The present estimated cost of the whole line, exceeds that submitted in the last annual report, $42,560.25.

The five divisions named in this report, vary from those spoken of in former reports. They have been adopted as being more convenient, as they embrace portions of the canal that may be completed and made available at different periods.

The cost of the several divisions as distinguished in this report, the amount of work done and to be done, may be stated as follows :

First Division.

From Rochester to Genesee River dam, 36 miles.

Estimated cost, viz :

Amount contracted, ...	$899,752 38	
Amount to be contracted as estimated, .	5,000 00	
		$904,752 38

Amount done,		881,401 50
Amount to be done,		23,350 88

Second Division.

From Genesee River dam to Dansville, $16\frac{34}{100}$ miles.

Amount under contract,	$492,911 58	
Amount to be contracted as estimated,	1,200 00	
		$494,111 58
Amount done,		379,077 78
Amount to be done,		115,033 80

Third Division.

From Junction at Shaker's Settlement to Portageville, $16\frac{97}{100}$ miles.

Amount under contract,	$1,430,142 73	
Amount to be contracted as estimated,	20,698 87	
		$1,450,841 60
Amount done,		556,709 13
Amount to be done,		894,132 47

Fourth Division.

From Portageville to Genesee River feeder, $19\frac{28}{100}$ miles.

Amount under contract,	$595,305 22	
Amount to be contracted as estimated,	21,219 87	
		$616,525 09
Amount done,		271,701 48
Amount to be done,		344,823 61

Fifth Division.

From Genesee River feeder to Olean, $29\frac{90}{100}$ miles.

Amount under contract,	$707,617 23	
Amount to be contracted as estimated,	514,202 31	
		$1,221,819 54
Amount done,		174,135 84
Amount to be done,		1,047,683 70

The aggregate estimate, including reservoirs, is 4,688,050 19

The amount of work under contract at contract prices, is	$4,125,729 14	
The amount of work not contracted, at estimated prices, is	562,321 05	
		4,688,050 19
The amount of work done, is	2,263,025 74	
The amount of work to be done, is	2,425,024 45	
		4,688,050 19
The total amount expended for work done up to 10th January last, was*		$1,355,427 97
For engineering and other incidental payments for the same time, was		117,535 85
Making the sum of		$1,472,963 82
The amount expended the past year on contracts and miscellaneous payments, is	$907,597 77	
For engineering and other incidentals,	42,097 15	
		$949,694 92
Damages awarded by the canal appraisers,	$5,237 33	
Allowance by Canal Commissioners to Turner, Powers & Co.	10,888 00	
		16,125 33
Total amount expended to January 1st, 1841,		$2,438,784 07

To prosecute the work at the same rate the ensuing year, will require the sum of $949,694.92, or a monthly expenditure of $79,-141.24. But to complete the canal on the first day of July, 1842, at which time all the existing contracts south of Mount-Morris expire, (except those on the Dansville branch,) $1,650,000.00 will be required.

The amount of land-damages accruing on the line of the canal, are not included in the foregoing estimates. The claims on the division from Rochester to Mount-Morris, have been investigated by the canal appraisers; and the awards, it is expected, will be made during the present winter.

*This sum is less by $1,300, than the amount carried into the last annual report—it being an allowance by the Canal Board to I. Hayes, paid by Commissioners of Canal Fund.

A TABLE

Showing the amount and kind of property transported, and the tolls received upon the same, on the Genesee Valley canal, furnished by the collectors at Scottsville and Rochester.

ARTICLES.	ROCHESTER OFFICE.			SCOTTSVILLE OFFICE.	
	Quantity first cleared.	Quantity left.	Tolls on each article.	Quantity first cleared.	Tolls on each article.
Furs and peltry, pounds,	.....	1,700	.....	$3,672	$0 76
Boards and scantling, M. ft.	3,900	424,246	$3 23	578,803	212 15
Shingles, M.	5	186	0 06	392,371	28 51
Timber, 100 C. ft.	.....	2,628	1 83	4,659	8 99
Staves, pounds,	40,000	.....	5 87	130,000	11 70
Wood, cords,	.....	101	6 26	15	3 30
Ashes, bbls.	.....	24	0 13	111	8 27
Pork, do	35	55	3 31	171	7 02
Beef, do	.....	1	.....	4	0 29
Cheese, pounds,	.....	1,373	.....	9,780	2 23
Butter and lard, pounds,	.....	13,634	.....	50,652	11 28
Wool, pounds,	.....	866	0 01	13,895	2 69
Flour, bbls.	12	493	19 69	38,920	1,048 79
Wheat, bushels,	.....	176,693	487 00	196,619	2,346 07
Corn, do	.....	.....	.....	24	0 24
Barley, do	.....	.....	.....	2,942	16 26
Other grain, bushels,	.....	.....			
Bran and ship stuffs, bushels,	2,310	.....	10 71		
Peas and beans, do	.....	.....	.....	3	0 06

TABLE.—(CONTINUED.)

ARTICLES.	ROCHESTER OFFICE.			SCOTTSVILLE OFFICE.	
	Quantity first cleared.	Quantity left.	Tolls on each article.	Quantity first cleared.	Tolls on each article.
Potatoes, bushels,	.....	.....	0 06		
Dried fruit, pounds,	.....	176	.....	1,421	0 22
Domestic cotton, pounds,	475				
Clover and grass seed, pounds,	.....	6,285	.....	23,280	5 56
Domestic spirits, galls.	.....	.....	.....	9,191	6 42
Leather, pounds,	.....	.....	0 10		
Furniture, do	70,997	17,889	25 18	53,983	10 65
Bar and pig lead, pounds,	.....	.....	0 33		
Pig iron, do	110,256	200	33 12	2,389	0 33
Iron ware, do	49,325	4,425	27 65	4,892	2 80
Salt, bbls.	2,624	.....	107 48	188	9 01
Merchandise, pounds,	1,799,925	10,952	1,018 65	54,694	35 50
Stone, lime and clay, pounds,	193,153	4,410	39 05	4,079,455	232 56
Gypsum, do	.....	9,600	.....	262,800	5 30
Mineral coal, do	57,960	.....	29 34		
Sundries, do	58,805	78,394	15 39	53,158	14 18
Boats, toll at 2 cts.	.....	.....	203 55	.....	212 38
Packets,	.....	.....	174 96	.....	202 32
Commutation toll,	.....	.....	14 77	.....	53 32

Passengers, monthly statements,			190 58		10 45
do reported,			1 23		
			$2,419 54		$4,509 61

Tolls collected at Rochester office,	2,419 54
Total tolls collected on the canal,	$6,929 15

The Commissioners deem it proper here to state, in answer to a resolution of the Assembly, passed May 14th, 1840, calling on them for an estimate of the expense of constructing the extension of the Black River canal, from Carthage to some point or points on Lake Ontario, or the St. Lawrence river, the probable amount of revenue to be derived from the same, when in full operation, and the probable increase of revenue to that part of the Black River canal already authorized to be constructed, and such other matters as shall have a bearing on the expediency of extending the Black River canal, that they have no adequate means of judging of the probable amount of revenue which would be derived from an extension of said canal, on either of the proposed routes, or of the probable increase of revenue to that part of the Black River canal already authorized. From the nature of the subject, such estimates must, necessarily, be conjectural; and the Commissioners do not feel authorized to submit any estimate which migh tbe taken as a basis for legislation. But from the best information which they have been able to obtain, they feel compelled, by a sense of duty, to express their opinion, that the total revenue which would accrue to the State, from such extension, would not, at least, for some years to come, defray the cost of repairs and superintendence.

For an estimate of the expense of such extension, the Commissioners beg leave to refer to the full and able report of Edward H. Broadhead, civil engineer, (Assembly Doc. 1840, No. 233,) made in pursuance of an act of the Legislature, passed May 3, 1839, entitled "an act authorizing a survey of the northern termination of the Black River canal."

By the act of May 11, 1840, the Canal Commissioners are authorized, under certain limitations and conditions, to purchase for the State, the Oneida Lake canal and feeder. A committee of the Board have given to that work a personal examination, and a survey and estimates have been made of the premises. But the discharge of other official duties has so fully engrossed the time and attention of the Acting Commissioners, that the Board have not yet been able to act definitely in the matter. Their proceedings under this act will therefore be made the subject of a future communication to the Legislature.

The following is a statement of the amount of expenditures on the canals, by the Canal Commissioners, from the 30th September, 1839, to the 30th September, 1840.

These statements are taken from the accounts kept in the canal room at the Comptroller's office, and include such expenditures as were made, and the vouchers therefor returned to that office by the 30th September last, and from the 30th September to the 15th December, 1840, as the accounts for the fiscal year are closed at that office on the 30th September.

Th following is an account of the sums disbursed by the Canal Commissioners on all the canals, from October 1st, 1839, to September 30th, 1840, (both days inclusive.)

	Bouck.	Baker.	Earll.	Ruggles.	Whitney.	Dexter.	Hudson.	Boughton.	Total.
Erie and Champlain canals,	----------	$1,117 56	----------	$350 00	$15,501 32	----------	$3,025 00	----------	$19,993 88
Erie canal enlargement,	$717,082 46	135,131 44	$146,545 06	163,017 62	1,246,985 53	$265,896 13	228,933 27	$328,779 15	3,232,370 66
Chenango canal,	1,836 51	----------	----------	----------	----------	10,396 39	----------	----------	12,232 90
Black River canal,	----------	208,194 32	----------	----------	----------	329,600 42	----------	----------	537,794 74
Oneida river improvement,	----------	----------	4,269 44	----------	----------	----------	11,859 50	----------	16,128 94
Chemung canal,	----------	----------	68 50	----------	----------	----------	----------	----------	68 50
Genesee Valley canal,	----------	----------	----------	471,854 96	----------	----------	----------	679,799 01	1,151,653 97
Tonawanda & Ellicott creeks,	----------	----------	----------	10,212 42	----------	----------	----------	22,680 74	32,893 16
	$718,918 97	$344,443 32	$150,883 00	$645,435 00	$1,262,486 85	$605,892 94	$243,817 77	$1,031,258 90	$5,003,136 75

The following is an account of the sums disbursed by the Acting Canal Commissioners, from October 1 to December 15, 1840, inclusive:

Erie and Champlain Canals.

Asa Whitney,		$8,100 00

Erie Canal Enlargement.

Asa Whitney,	$394,004 62	
S. Newton Dexter,	98,429 57	
David Hudson,	68,351 15	
George H. Boughton,	70,236 08	
		631,021 42

Chenango Canal.

W. C. Bouck,	$50 00	
S. Newton Dexter,	1,519 85	
		1,569 85

Black River Canal.

S. Newton Dexter,		103,097 70

Oneida River Improvement.

David Hudson,		6,573 75

Chemung Canal.

David Hudson,		694 50

Genesee Valley Canal.

George H. Boughton,		204,137 40

Tonawanda and Ellicott Creeks.

George H. Boughton,		5,281 00
		$960,475 62

The following statement will show the amount which will be required up to the 1st of March, 1842, to continue, at the present rate of progress, the work now under contract—including such additional portions above specified in detail, as should be put under contract during the year 1841:

On the enlargement of the Erie canal,	$4,386,000 00
do Black River canal and feeder,	750,000 00
do Genesee Valley canal,	1,250,000 00
Rebuilding Chemung canal locks,	164 000 00
	$6,550,000 00

All which is respectfully submitted.

SAMUEL B. RUGGLES,
HENRY HAMILTON,
A. WHITNEY,
S. NEWTON DEXTER,
DAVID HUDSON,
G. H. BOUGHTON.

Albany, January 25, 1841.